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REPORT

FIRST EDITION

OF

E. B. BORRON, STIPENDIARY MAGISTRATE,

ON THAT PART OF

THE BASIN OF HUDSON'S BAY

BELONGING TO THE PROVINCE OF ONTARIO.



Toronto:

PRINTED BY THE "GRIP" PRINTING AND PUBLISHING COMPANY.

1884.

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COLLINGWOOD, 26th February, 1884.

The Honourable O. MOWAT,
Attorney-General,
Toronto.

SIR,—I have the honour to transmit herewith my report for last year.

In it, a detailed account is given of my exploration is in the Provincial Territory, on and beyond the Height of Land.

Some subjects which appeared specially to demand it, have been discussed under separate and appropriate heads.

I have once more to acknowledge the obligations I am under to all the officers at the Honourable Hudson's Bay Company's Posts visited by me this season, for assistance willingly afforded, and numerous acts of kindness conferred on myself and companions.

I have the honour to be,

Sir,

Your most obedient servant,

E. B. BORRON,
Stipendiary Magistrate.

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REPORT

OF

G. B. Borron, Esq., Stipendiary Magistrate,

ON THAT PART OF THE

BASIN OF HUDSON'S BAY

BELONGING TO THE PROVINCE OF ONTARIO.

That part of the Territory north of the Height of Land to which my attention has been more particularly directed this season, is situated between the Missinaibi branch of Moose river and Albany river. Previous journeys, to and from Moose Factory, had taken me over nearly every known canoe route by which it is possible, to pass from Lake Huron to James' Bay. These routes, however, have traversed almost exclusively that portion of the so-called "Disputed Territory" lying to the eastward of the Missinaibi river. The following brief description of the routes already travelled will make this plain. In 1879, on the occasion of my first trip to Moose Factory, I ascended French river to Lake Nipissing, crossed the Height of Land which divides the waters flowing into the Ottawa from those flowing into the Georgian Bay, and followed the Mattawan river from its source to its junction with the Ottawa river. This river was now pursued on its northerly or upward course until the upper end of Lake Temiscamingue was reached. Here the country rises suddenly, and on again entering the river, no fewer than fifteen portages were necessary, in less than as many miles. These are known to voyageurs as "the Quinzes." Entering Lac-Les-Quinzes, the route which had been easterly in the last stretch, again resumed its northerly course. While the main Ottawa river flows into the eastern arm of this lake, our route took us up the northerly arm, and thence through a chain of lakes connected by two or three short portages for fifty miles, when the Height of Land was reached. Crossing this, we struck a chain of lakes in which the Abittibi river takes its rise. Passing through these lakes, and Lake Abittibi itself, we descended the Abittibi river to its junction with Moose river, and followed that river to our destination, Moose Factory. I returned late in the fall of the same year to Lake Superior, by what is known as "the Michipicoten route." Starting from Moose Factory, we ascended the main Moose river to the junction of the Mattagami (sometimes called the South Branch) and the Nissinaibi (sometimes called the Brunswick or North Branch). The route then takes up the Missinalbi, or Westerly Branch, and this was followed to its source, Lake Missinaibi, on the Height of Land. From this a short portage took us to Crooked Lake, and another, also short, to Dog Lake. In this last lake, the Michipicoten River has its source, and this was followed down to Lake Superior.

In 1880, I proceeded to Moose Factory by the Michipicoten route, explored the territory in various directions from Moose Factory as a centre, and returned by the

Abittibi and Ottawa route. Several considerable deviations, however, from the route usually followed, took place. For instance, when on my return, we had reached Lake Temiscamingue, instead of going on to Mattawan and ascending that river to Lake Nipissing, we turned up a branch of the Montreal river and passed through a chain of small lakes which led us to Lake Temagaming, from whence we descended the Temagaming and Sturgeon rivers to Lake Nipissing, and thence down French river to the Georgian Bay,

In 1881 I again commenced my trip at Michipicoten, but only followed that route a few miles north of Lake Missinaibi, when we struck eastward to Flying Post on the Ahkuckootish or Ground-hog river; and from thence to Matawagamingue Post still further to the eastward. The Mattagami or South Branch of Moose river issues from this lake, and down it we took our way for some 285 miles to Moose Factory. Returning, I followed the coast of James' Bay to Albany Factory, ascended the Albany river four hundred and twenty or thirty miles to Osnaburgh Post on Lake St. Joseph. From this lake which is nearly on the Height of Land that divides the waters flowing into James' Bay from those flowing not only into Lake Winnipeg, but also into Lake Superior, it was my intention to have pursued a rarely travelled rout to Lake Nipigon and thence followed the Nipigon river to Lake Superior. I was, however, unable to obtain any guide at Osnaburgh who knew this route, and therefore compelled to go from thence to Lac Seul or Lonely Lake. From this we struck south and intersected the C. P. R., near Wabigoon Lake, and took a construction train from thence to Prince Arthur's Landing.

Last year (1882) I commenced my journey at the mouth of the Mississauga River which I ascended to the Height of Land. Crossing this I struck the "head waters" of the Ahkuckootish or Ground-hog river. This was followed down to Flying Post and from thence to its junction with the Mattagami. Thereafter the route to Moose Factory was the same as that of the preceding year. Returning, I ascended the Moose and Mattagami rivers to the source of this last on the Height of Land. Crossing "the divide," I struck the head waters of the Spanish river which were followed until we approached within a few miles of the Hudson's Bay Company's Post on Whitefish Lake, to which we crossed over. Thence we pursued the usually travelled route down Whitefish river to the Georgian Bay.

These routes will be found roughly delineated on the sketch map which accompanied the Report of last year.

Thus it will be perceived that while I have had opportunities of obtaining at least a good general idea of the character and resources of the eastern division or half of this territory—my personal knowledge of that part lying to the westward of the Missinaibi has hitherto been confined to what I could gather from other sources. It is true that I had travelled round three sides of it, on my voyage from Michipicoten to Moose Factory—from Moose Factory to Albany Factory, and from this last Post to Osnaburgh. But before this year I had not penetrated into this region more than a few miles, with the exception of one point, some ten or twelve miles above Moose Factory, where a tributary river was ascended for nearly a hundred miles. When we consider, however, that the area of the territory referred to is not less than thirty thousand square miles, it must be obvious to all how little could be thus ascertained in reference to it. Nor, by those who know the difficulty of getting through the country, will too much be expected from the explorations of one short season.

With the information I had before me, I concluded that this year the route which might be expected to yield results most interesting and important to the Government and Province of Ontario, would be as follows:—To ascend Nipigon river to Lake Nipigon; thence strike eastward to Long Lake; from Long Lake to descend the English or Kenogami river to its junction with the Albany, and then down that river to Albany Factory. From Albany Factory, the coast of James' Bay might be followed to Moose Factory.

On my return I proposed to ascend the Missinaibi Branch of Moose river to New Brunswick, and if practicable, to cross the country from thence to Long Lake. From Long Lake reach Lake Superior by the Hudson Bay Company's route to Pic; and thence along the shore of Lake Superior to Michipicoten.

On the 30th of May, in pursuance of this plan (subject to such modifications as circumstances might render necessary), I started from Sault Ste. Marie on the steamer, Frances Smith for Red Rock, Nipigon Bay.

The boat was advertised to call at the various ports on the north shore of Lake Superior, and it was natural to suppose it would do so on the way up. I was, however, disappointed to learn on going aboard that it was the Captain's intention to proceed straight to Prince Arthur's Landing, and call at Red Rock only on his return. It had been arranged with the forwarders to divide our provisions into three parts—one to be taken with us, and the other two portions to be left at Michipicoten and Pic. These last were to be sent inland to meet us at Long Lake and New Brunswick, as it would be impossible to take with us over the route we proposed following, anything like the quantity of provisions we would need—and I could not rely on getting any from the Hon. Hudson's Bay Company at inland posts, such as Long Lake and English river. As will afterwards appear, this failure of the steamer to call at Michipicoten or Pic, either on its up or down trips, occasioned us a great deal of delay, trouble and expense.

It was the 3rd of June when we arrived at Red Rock. Owing to the vigour with which work in this neighbourhood was being prosecuted by the contractors engaged in the construction of the Canadian Pacific Railway, it would have been all but impossible to have procured either men or canoes, had I not anticipated this difficulty, and made such provision to meet it as rendered me in some measure independent.

With all the assistance that Mr. Flannigan, the officer in charge of the H. B. Co's Post at Red Rock, could give me, however, I was unable to get a guide to Lake Nipigon, and finally, having waited three or four days, started without one. I still hoped, however, we might succeed in obtaining a guide at the Catholic Mission on Lake Helen, or possibly meet some Indian on the river. My party consisted of Messrs. H. C. Hamilton and A. H. Scott, of Toronto, Robert Nolan, of Sault Ste. Marie, who was with me last year, and John Sampson Legarde, of Michipicoten river.

Persuaded that information obtained in the course of an exploration of this nature can be best presented in the form of a narrative, I shall again adopt that method in this Report, supplementing it with such observations on particular points and subjects, as may appear to be specially called for.

FROM RED ROCK, LAKE SUPERIOR, TO NIPIGON HOUSE (LAKE NIPIGON.)

June 7th.—Having failed in a last attempt yesterday to obtain a guide at the Catholic Mission on Lake Helen, and put our canoe, which had proved very leaky, in better order, we left early this morning and crossed over to the mouth of the Nipigon river, some four miles distant from the settlement, and about the same from Red Rock. Lake Helen appears to be seven or eight miles in length, and from half a mile to two miles in breadth. It is only a very few feet (I should say not more than four or five feet) higher than Lake Superior. This occasions a rapid at its outlet, just a little above the Hudson's Bay Company's Post at Red Rock, to which the Lake Superior steamers can ascend. There is a limited area of arable land at the Indian Settlement and Mission, on which potatoes would seem to be the principal if not the only crop grown. I noticed quite a heavy bank of clay there—probably a drift or boulder clay, and containing a good deal of lime. The timber is for the most part small and poor, necessarily so on the barren, rocky ridges, but arising, where there is any soil, from the fact that fires have passed over the greater part of this country too recently to admit of the growth of heavy timber.

We had not advanced far up the river when we came to an Indian camp; and here we succeeded, much to our satisfaction, in hiring two Indians, who were willing to be our guides as far as "Nipigon House," the Hudson Bay Company's fur trading post on Lake Nipigon.

As we ascend the river in a north-westerly direction the banks, at first low, become higher; the breadth decreases and the current is stronger. Although rocky ridges are

generally not far distant on one side or the other, limited areas of land well suited to the growth of potatoes and hay, and capable of affording excellent pasture for cattle, are not unfrequently met with. Some five or six miles from Lake Helen a tributary joins from the west, the water of which is precipitated from a height of about twenty feet into Nipigon river. A little above this we come to a rapid, at the foot of which, on the west side, is the second Portage (from Red Rock). On the opposite, or east side, is "Camp Alexander," well known to all the anglers who resort to Nipigon river to enjoy the speckled trout fishing, for which it is famous. Mr. Alexander, after whom the spot is called, was an enthusiastic fisherman, from St. Louis, in the State of Missouri, who was wont to fish here upwards of twenty years ago, and with whom this was a favourite camping ground. In former times an angler, even if not very expert, could catch great numbers of trout, many of which would weigh from two to six pounds. Very large fish are, I believe, not so plentiful now as they once were, and as the number of anglers increase they may be expected to become less common. Nipigon, however, will always take a high rank among the trout-fishing rivers of this country, if not ruined by sawdust and nets.

Following the portage at which we had arrived, for about a third of a mile, we came to a brook, which was ascended for a short distance and brought us to the third Portage. This is nearly two miles in length, and we only got part of our baggage and supplies over before it was time to camp. The fall in the rapids which renders this and the preceding portage necessary is not less, I think, than one hundred and twenty-five feet. The rock, where exposed, seems to be for the most part trap and felspathic gneiss.

The timber near the river has been destroyed by fire. So complete, in some cases, has this destruction been that a good range for cattle could be had at little or no cost of clearing. This was particularly noticeable at the south end of this last portage. Vegetation is very backward, this having been, I believe, an exceptionally cold spring. Wild strawberry plants are only just now coming into blossom. The cherry is putting forth leaves; but the willow shows nothing as yet but catkins. The smaller aspen and white birch are budding out; but there is hardly a vestige of anything in the way of foliage on the larger trees, of which a few here and there have escaped the last fire. All the clays which I met with to-day were calcareous or, properly speaking, marls.

June 8th.—It was eleven o'clock before everything had been got over the portage, and we were again ready to embark on a lake-like expansion of the river. The weather was exceedingly stormy and wet, and it was with some difficulty that the upper end of this lake, which turned out about three miles in length, was reached. Here we landed for dinner, and the rain and wind continuing unabated, we ultimately camped for the night.

The country on both sides this stretch has been burnt over, and appears to be rocky and barren.

June 9th.—On starting this morning we had first a half mile of river, the current in which is at this point pretty strong. We then entered a lake some three (3) miles in length, which, with another mile of river, brought us to the next portage. In the last stretch the river contracts to two chains in width, and passes through a gorge in trap rock, which is quite precipitous, particularly on the east side. This, the fourth portage, is not more than 150 yards in length, and the fall in the rapid is, I should say, about eight feet.

In a mile and a half further we come to the fifth portage. This is over a small island, and only fifty or sixty yards in length. The fall in the rapid at this point I estimate at five or six feet.

This last stretch is also through trap rock, the walls or cliffs on both sides of the river being quite precipitous, and in some places apparently not less than 200 feet in height.

Half a mile further, we came to the sixth portage, on the west side of the river. This proved to be about a mile and a half in length, and the fall in the rapids, by Dr. Bell's measurement, is forty-five feet. The frequency and length of the portages rendered our progress very slow, and we were obliged to camp at the upper end of this portage. Our course to-day has been generally north, or a little to the east of north; and the distance of this from our last camp is not more than eight miles.

On this stretch no good land or timber was met with, the country, as seen from the river, appearing exceptionally rocky or broken. A few white pine were noticed between the fourth and fifth portages, but they were few in number and small in size, the largest seemingly not more than three or four feet in circumference. Birch and aspen are the most common trees; and these, for the most part, a second growth, succeeding recent bush fires, which have destroyed the original forest.

The rock is principally trap, of which there would seem to be a good deal in this part of the country. I met with a few veins, but could see nothing in them but quartz carrying a little iron pyrites.

June 10th.—This being Sunday, we did not travel. In the course of the afternoon a party of Indians belonging to the settlement on Lake Helen passed down. They were returning from the Hudson Bay Company's Post, on Lake Nipigon, where they had been for seed-potatoes, of which they had a number of bags with them. Each man took a couple of bags on his back, and trotted off over the portage. It was their intention to plant these immediately on their return home. Reckoning the time and labour of the party at the wages current at Red Rock, these potatoes will cost them probably \$3.00 or \$4.00 a bushel; whereas, with a little foresight and prudence, they might have saved enough of seed from the crop of last year, or even got them from Collingwood or Owen Sound, by steamer, for \$1 or \$1.25 a bushel. The Indians are fond of potatoes, and are easily taught to grow them; and when once a family has experienced the great value of this crop, they rarely abandon its cultivation, if they can obtain seed. They are so thoughtless and improvident, however, that if a little pinched for food during the winter, they will eat or sell their last potato, and have nothing left for seed in the spring.

I sent back, with this party, one of the Indians from Lake Helen, the other having agreed to go with me as far as Long Lake.

June 11th.—Rather a sharp frost during the night; for although the thermometer did not register a lower temperature than 33° Fah., our tents and tarpaulins were covered with hoar-frost at four o'clock this morning.

Starting from here, one and a third miles on a course some eight or ten degrees east of north brought us to the next or seventh portage, called "Smooth Rock." This portage does not (as usual) commence at the foot of the rapid, which renders it necessary, but nearly a third of a mile north-west of it. It is only about 250 yards long. The fall in the rapid is not, I think, more than twelve feet.

A mile and a half from the upper end of this portage, on a northerly course, brought us to a point where the main Nipigon river is left on the right, and we ascend a small and insignificant stream, with barely sufficient water to float our canoe. Picking our way among the boulders up this stream for half a mile, on a course N. 15° W., we entered a lake called "Big Sturgeon Lake." This lake has several deep bays or arms, and is probably much larger than it appears. Three miles on a course bearing north, sixty degrees west, brought us to the eighth and last portage. It pursues a north-westerly course for three-quarters of a mile, and terminates at what is known as the South Bay of Lake Nipigon, some distance to the westward of where the river leaves it. The fall in the rapids, which I did not see, will not exceed, I think, what Dr. Bell makes it, nearly eighty-one feet. This portage is called Flat Rock Portage by the Indians, and the name is very appropriate. It is singularly bare, flat and smooth throughout the entire length nearly of the portage. In some places it is curiously jointed and veined. I fancy that it has formed the upper surface of a trappian overflow, the rock being in some places very fine grained and dark, and in others resembling the ordinary grey trap. The country passed through on this stretch appears to be rocky, barren and unsuitable for settlement. The timber consists of poor spruce, tamarack, birch and aspen.

Roughly estimated, I should say that the distance from Red Rock to Lake Nipigon does not exceed thirty miles, and that the difference of level between this lake and Lake Nipigon is not more than 300 feet. With only one small pocket Aneroid barometer, however, it is impossible to take the rise or fall with any pretensions to accuracy.

The following are the portages on Nipigon river, with the falls in the rapids, as determined by Dr. Bell. (See Report of Progress of the Geological Survey, 1866 to 1869, p. 338):—

	FEET.
Current between Red Rock and Lake Helen.....	2
Current in river from Lake Helen to Camp Alexander, six miles.....	6
Chute at Camp Alexander.....	4
From the last to foot of Long Portage, by way of Portage Brook.....	8
Rapids at Long Portage.....	137
Currents in the narrows between Lakes Jessie and Maria.....	$\frac{1}{2}$
Current from lake to Cedar Portage.....	1
Cedar Chute	10
Current from Cedar Chute to Island Chute.....	1
Island Chute.....	7
Current from the Island to One Mile Portage.....	2
Rapids at One Mile Portage	45
Current from One Mile Portage to White Chute	1
White Chute	6
Current in brook between Lakes Emma and Hannah (or Big Sturgeon Lake).....	1
Rise from the last lake to Lake Nipigon (Flat Rock Portage).	$81\frac{1}{2}$
Lake Nipigon, above Lake Superior.....	313

On the Canadian Pacific Railway Map, in my possession, the height of Lake Nipigon above the datum line or level of the sea is 850 feet, which is somewhat less than Dr. Bell's estimate.

We now embarked on Lake Nipigon and crossed the first deep bay ; but the wind rising, with threatened rain, we landed and camped on the shore of a small bay, about three and a half miles from the portage. Here I noticed a black sand which, at first sight, I supposed to be hornblende, but found on close examination to be magnetic iron ore.

June 12.—It was still raining when we got up this morning, and we did not start until ten o'clock. After paddling some seven miles we were again compelled to go ashore, having come to a point where it was necessary to make a succession of long traverses, exposed to the full sweep of the wind. These traverses, as they are called by voyageurs, are generally made from point to point across the mouths of deep bays to avoid the loss of time and greatly increased distance entailed by following the shore and going round them ; or a traverse may be made across a lake, or the estuary of some large river. Such traverses, if long, cannot be safely undertaken in a heavily laden canoe in stormy or unsettled weather.

June 13.—This morning was clear and cool, and we made an early start. Half an hour's paddling brought us to the entrance of Chief's Bay. This is a large bay, apparently not less than ten miles in depth. The traverse, where we made it, is about four miles on a north-westerly course ; there appeared to be a point, however, further in the bay, where the straits or channel was not more than two miles in width. Having made the traverse, we came, in about two miles, to a well sheltered little bay where we landed for breakfast, and while it was preparing I ascended one of the highest hills in the neighbourhood. It was 400 feet above the level of the lake and composed of gray trap. Fire had passed over it apparently not more than three or four years ago, and the timber had been all killed or burnt entirely off. The rock (partly, no doubt, in consequence of the heat to which it had been exposed) is in many places much decomposed, crumbling into pellet-like and ball-shaped pieces of a dirty brown colour, reminding me of rocks presenting the same appearance at Mamainse on Lake Superior. I saw, however, no veins or minerals of economic value, the soil, where any, seemed good, being a warm, friable, brownish loam. After breakfast we made another traverse, which took us nearly three hours, and the distance here from land to land must be at least nine or ten miles. The bearing was about N.N.W. From this to the Hudson's Bay Company's Post our course was a little more westerly, and the distance about seven miles. This makes the distance from Flat Rock Portage to the Post, about thirty-five miles. This estimate is based on the assumption that when paddling we made about three miles an hour. I may remark, however,

that Mr. DeLaronde, the officer in charge of "Nipigon House," makes the distances from the Post to Flat Rock, and from thence to Red Rock, considerably more than I have estimated them at.

At this Post I expected to be able to obtain reliable information in regard to the route to Long Lake, and to secure the services of a competent guide. I hoped too, to have been able to exchange my canoe for another, or others more suitable for the route I proposed following. I was sorry to find that the route to Long Lake, although practicable for small canoes, would, at least, present great difficulties to our passage over it in a large four fathom canoe, and that the trip would, at best, be slow and laborious. Mr. DeLaronde informed me that there were no canoes such as I wanted at the Post, and that it was even doubtful if another man could be got.

June 14th.—The Hudson's Bay Company's establishment here is not as large as I expected to see. The site is rather pretty, and very well sheltered by an island, so much so that, on approaching it from the open lake, it cannot be seen by the voyager until he is close to it. A catholic mission has been established a mile or so to the eastward of the Post, which is conspicuous at a distance of four miles.

I was not very favourably impressed with either the climate or the soil. In fact, with the exception of a few hours, it rained almost the whole time we remained at the Post. The soil fit for cultivation, so far as it fell under my observation, is only found in patches here and there, between exposures of rock. It is a sandy loam, and moderately fertile. Mr. DeLaronde informs me that Indian corn, barley, peas, kidney beans, carrots, turnips, onions and cabbage can be grown. I should not have expected Indian corn to grow, or at all events attain maturity. I have no doubt, however, that wheat will grow and ripen perfectly, wherever a suitable soil can be obtained. Mr. DeLaronde says that the ice disappears from the lake about the latter end of May. He tells me that there are some red pine, but no white pine, so far as he has seen, on Lake Nipigon. The principal timber consists of tamarac, cedar, spruce, poplar, birch and aspen. There is good meadow land, he informs me, at the mouth of Gull river, and that clay can be found in many places on digging for it. Limestone (probably crystalline), is said to have been found in two or three places. Lake Nipigon has not as yet yielded to the explorer, much in the way of valuable minerals, but may do so in the future.

All the different kinds of fish found in Lake Superior are equally good and plentiful, I believe, in Lake Nipigon. Mr. DeLaronde enumerates the following species, viz.:—whitefish, lake trout, speckled trout, silver fish, which attains a weight of 6 lbs., and is, I presume, a variety of whitefish like the tuliba of James' Bay. Then there are sturgeon, pike, suckers, dore or pickerel, perch, chub, and a small fish three or four inches in length resembling the sardine, but this is most likely, I think, the young or fry of some of the larger species. There is no doubt, in view of the size of Lake Nipigon, that when markets, become accessible by rail, fisheries will be established and become an important industry. Dr. Bell makes the length of Lake Nipigon 70 miles, and its breadth about 50 miles, with a coast line of nearly 600 miles.

June 15th.—To-day we had one of the severest thunder storms I ever remember to have experienced in this country. It lasted five or six hours, the rain descending in such torrents that our camping ground was flooded, and we were literally "drowned out" of our tents. But for the kindness of Mr. DeLaronde, who provided us with shelter and dry blankets we should have been obliged to pass a very uncomfortable night.

June 16th.—A fine morning at last, but most of our things being wet, I concluded to delay our departure until the afternoon, in order that they could be at least partially dried.

Mr. DeLaronde had engaged a man to accompany me to Long Lake. Unable to obtain half-sized canoes, two of which would have answered me better, there was nothing for it but to make the trip in our large canoe, which, if once at Long Lake, would thereafter be more suitable in some respects than smaller ones. In order to lighten our load and lessen the labour of portaging, which I was led to expect would be severe, I parted with almost all superfluous articles of luxury that Mr. DeLaronde was willing to take off my hands.

FROM LAKE NIPIGON TO LONG LAKE.

At 2 p.m. we got under way, and pursuing an east south-east course for about 12 miles, camped on an island near a point, at which my guides said a long traverse would be necessary. We had barely got our tents pitched when rain, accompanied with thunder, lightning and wind again came on—but very moderate as compared with yesterday. Even this storm, however, would have been far from pleasant if it had overtaken us when making any of the traverses referred to.

June 17th.—This being Sunday we remained encamped.

June 18th.—Started at 6 a.m. and took a south-easterly course across the lake for the mouth of the Mamaominikon or Sturgeon river. This we reached about four o'clock in the afternoon. The distance is about 20 miles—and made up of long traverses, from island to island. In crossing to the north and east of Gros-Cap, we were able to form some faint idea of the size of this lake. Fogs are seemingly frequent, and “the mirage” is also seen elevating and distorting objects at a distance. The temperature of the air during the day varied from 49° to 59° , and of the water from 40° to 49° . Ice was seen on the islands in one or two places—an evidence of the coldness and backwardness of the season. The islands we passed were mostly composed of trap-rock; and though less elevated, reminded me of those seen in the neighbourhood of Thunder Bay, on Lake Superior. Vegetation was very backward; and the timber, where exposed to the sweep of the wind, was stunted and poor. Although I have been disappointed with that portion of the country bordering on Lake Nipigon, now for the first time seen, I have no doubt, however, that on the west side, and up the rivers which empty into the lake, more or less land fit for cultivation will be found.

The Sturgeon river is about two chains in width, with a moderately strong current. The water is much darker than that of the lake itself. Near the mouth, sandstone, slate and conglomerate rocks were met with “in place.”

We ascended the river about three miles, and camped a little below the first rapid and portage.

The soil on the banks is a sandy loam reposing on clay, and from the appearance of the timber, I should take it to be a tolerably good soil. The timber consists of aspen spruce, tamarac and birch, with some rough bark or banksian pine.

June 19th.—It commenced raining yesterday afternoon, and has continued to do so with little or no intermission all night. It had not abated this morning, and knowing the state the portages would be in, and how drenched everything would get, I waited until mid-day to see if it would not clear up. Disappointed in this, and impatient at the delay, we started at 2 p.m. The first portage, which was close at hand, turned out to be quite short, not more than 100 yards in length. The fall here is about ten feet. In two miles more we came to the second portage, about two hundred yards in length, with an estimated fall in the rapids of fifty feet. Both these portages are on the south side. In another two or three miles we arrived at the third portage, where we camped for the night.

June 20th.—The temperature of the air fell to 32° or freezing point last night. This (3rd) portage is a mile and a quarter in length, and the fall in the rapids probably not less than forty feet. But little rock is visible on the portage, but that seen was trap. Owing to the length of the portage, and difficulty experienced in getting the canoe across, it was two o'clock in the afternoon before we were ready to start again. In three or four miles more we came to the fourth portage, 200 yards long with a fall of about ten feet in the rapid. A short distance above this, a demi-charge was necessary, and at the end of another mile, or say about two miles from the fourth portage, we arrived at the fifth portage, and there camped. The timber met with on this stretch was mostly spruce, banksian pine, tamarac and cedar. On the low, flat river bottom, between the third and fifth portages, there is a considerable quantity of tamarac and cedar. At the upper end of the third portage I measured aspen, poplar and balsam trees that were 42 inches in circumference, spruce 70 inches, and white birch 40 inches. The rock at fourth portage and demi-charge consists of greenish grey slates with veins of quartz. At the west end of the fifth portage we found a tree blazed, and marked “C. P. R., September 17th, 1881.”

In ascending the river our course thus far has been, on the whole, pretty steadily eastward. The average width of the river has been about two chains.

Black flies were out in force to-day. It is the first time they have been troublesome this season.

June 21st.—The fifth portage, at the lower end of which we camped last night, turned out to be fully a mile long, and much time was consumed in getting our things and the canoe over it. The fall here is estimated at 35 feet. Embarking once more, we met with no serious obstruction for about ten miles. Then we came to a long and very stony rapid, up which our progress was very difficult and slow. At the upper end of this a short portage (the sixth from the mouth of the river), was necessary. Again we started, and in two miles further arrived at another, the seventh portage, and camped. The fall in the stretch of river ascended to-day, inclusive of that at the fifth portage is estimated at fifty feet.

The soil is a sandy loam and in some places good meadows might be obtained on the banks of the river. The timber where unburnt consists of white birch, banksian pine, tamarac, balsam, spruce and aspen. For some distance above the fifth portage the land is low and flat on both sides of the river and bears cedar and tamarac of a size large enough for railway ties. The rock is mostly grey schistose rock or slate.

June 22nd.—About a mile above our camp on the seventh portage, we came to a short rapid which compelled us to make another, the eighth portage. This was only a few yards in length over a rock. We then encountered a strong current, to ascend which it was necessary to have recourse to our poles. Half a mile of this brought us to a fall of about six feet, where the ninth portage, some fifty yards only in length, had to be made. Between the eighth and ninth portages our course, hitherto easterly, turns to the south. Leaving the ninth portage, about an hour's paddling against a stiff current, on a course somewhat west of south, and at the end of which it was necessary to use the tow-line for a short distance, brought us out into a lake, from one-third of a mile to a mile in width. From a point below our last camp to this, only a few low rock ridges or rather reefs crossing the river have been met with. The country here is for the most part flat, with a light sandy or gravelly soil, and much of it has been over-run by bush fires, not many years ago. I should say that the greater part of this land would afford fair pasture if sown with the seed of grasses adapted to the soil and climate. On the river banks and bottoms a proportion of third-rate arable land could be obtained, which will at all events grow good crops of hay, roots, and barley, if not other grains.

In the lake which we have now entered, our course in a short time turned easterly, and the width increases to nearly a mile. It is called by the Indians "Nemenkawah." There appears to be a large marsh at the north-western side, which, like many others on the Height of Land, will some day or other become valuable for the hay it is capable of affording. In a mile and a half or so we arrived at where the river enters on the south side of this lake. Here there may be seen a few stunted black ash growing. Up this we pursued an easterly course for some two hours nearly, when we came to a rapid with a fall of eleven feet, requiring a portage (the tenth), about 100 yards in length, to be made. At the upper or eastern extremity of this portage I noticed another tree on which was marked "C. P. R., R. McLennan, September 15th, 1881." Above this, the river continues very irregular, rarely showing any well-defined banks, but opening out into small ponds and lakes, and again contracting several times in the course of the next five or six miles. The bearing is equally changeable, varying from east north-east to south-west, but on the whole south-easterly. About six miles from the last (tenth) portage we entered a lake, seemingly four miles in length by a mile in width. We take a south-east course along this for half a mile only, when we come to where a river enters on the east side. The route is up this and varies from east north-east to south south-east, alternately river, lake, pond and river, for a stretch of some three miles, terminating at a fall of six or seven feet in height, and a portage (the eleventh), ninety yards in length on the north-east side. This fall is called Ka-ka-gee-pid-jee-wan. Immediately below the fall, on the opposite side to that on which the portage is situated, there is a vein containing both copper and iron, the first in the form of a yellow ore and the latter as pyrites and "gossan," but in what quantity it was impossible to ascertain without tools, and more time and labour than we

could afford. In a more favourable locality it might be worthy of the attention of the explorer. We now entered a good sized lake above this portage, and camped on the north side about a mile and a half from the fall. Where our camp was pitched a ridge or point runs out for a quarter of a mile into the lake, composed of sand and gravel of the drift formation. In some places the ridge is about thirty feet in height and the bearing is nearly north and south. Here I found on the beach a number of pieces of fossiliferous limestone similar to those I got two years ago on Lake St. Joseph, at the source of Albany river, and likewise to those gathered at and above Flying Post, on the Akhuckootish, and Matawagamingue Post on the Matagami branch of Moose river last year; all of which, I think, can be plainly identified as having come from the Devonian rocks lying to the south of James' Bay.

The rocks met with to-day have been mostly greenish and grey-coloured schists, belonging, it is supposed, to the Huronian formation. In some places it had very much the appearance of a rock I have met with on the lakes at the source of the Abittibi river.

The timber, where standing, consists as usual largely of tamarac, spruce and cedar, with an increase in the quantity of rough bark or banksian pine. These are not large, being often too thick or crowded to admit of their attaining any great size. No red or white pine have so far been met with, but on the drier ridges, birch and aspen are common. I have seen no clays the last day or two, but banks sometimes thirty feet or more in thickness of fine grey sand have been observed in several places. I have no doubt, too, that the gravelly ridges frequently met with cover no inconsiderable portion of the surface not taken up with lakes and swamps.

June 23rd.—On starting this morning our course was from east to north-east up the lake on which we had camped, for some two and a-half miles. This brought us to the twelfth portage, which proved to be one of the longest met with on this route, being little short of two miles. It passes partly over a muskeg or peat moss, on which many of the plants usually met with on the muskegs, north of the Height of Land, were found growing. The portage takes an easterly course, and terminates at a small round pond or lake, apparently about half a mile in diameter. My barometer did not indicate much rise. The bank of this little lake, where the portage comes out, is composed of drift sand, and in it many bits of fossiliferous limestone were noticed.

It was two o'clock in the afternoon before we had got everything over this portage and were again ready to resume our journey. A mile and a half of lake and marsh, on a course a little south of east, brought us to a small stream, which soon led into a larger one. This is probably a tributary of the Mama-om-minnikan, which we have followed up from Lake Nipigon. This tributary flows north, and in about one-third of a mile enters a lake seemingly four or five miles long in a N.N.E. direction, and from half to three-quarters of a mile in width. The banks of this lake are very low, excepting at the north end, where the land rises to a height which I think cannot be less than 100 feet. On a point in this lake I again found pieces of fossiliferous limestone, not less than 100 pounds in weight, imbedded in the sands and gravel of the drift. The point referred to is on the east side of the lake, and about half a mile from a small stream which we now reach and proceed to ascend. This stream is not more than fifteen yards wide and comes from the north-east. In half a mile we arrived at a portage (the thirteenth) about 100 yards in length. Again embarking, three-quarters of a mile more brought us to the fourteenth portage which we found to be three hundred yards long. The fall in these two rapids is not more than ten feet. Again starting out from the upper end of this portage, we had only ascended about 200 yards when we entered a long narrow lake, the source of the stream we were following. This lake seems to be not less than four miles, and may be considerably more, in length, but it is only from six chains to half a mile in width. The bearing of its longer axis is N.N.E. The banks are very low, and timbered with small spruce and tamarac. Pursuing now a north-easterly course, at about half the apparent length of the lake, we make the mouth of a stream on the east side, which we ascend. The water is clear and the banks low. The timber is small, consisting of spruce, tamarac and cedar. In a mile or so we came to a good sized lake, and here we camped.

There were great numbers of pike feeding in the river at this point, and the voyageurs

caught, with a trolling line and spoon, eleven, weighing thirty-five pounds, in less than half-an-hour. My guide says that there are good whitefish in this lake.

At this camping place, I measured aspen that were four feet in circumference, white birch five feet and tamarac four feet. The soil is light and sandy, but is covered by a good thickness of vegetable or leaf mould, and even at this elevation (and we must be now almost on the water-shed) I have no doubt excellent crops of potatoes could be grown on land of this description.

Joseph, a native, and one of my guides, encouraged by the other voyageurs, favoured us with a specimen of his vocal powers in the language and style of his race. Each verse of the song began with "Yea yea, yauchee, O yea," and was continued and ended by a quick succession of nasal sounds and grunts that I am utterly unable to describe. He accompanied himself by drumming on the canoe, which, after being unloaded, had as usual been hauled out and turned bottom up. This song, or others set to the same air, is known to and sung by the Indian medicine men and conjurors, not only of the Ojibbewas but other tribes, and has, I suspect, its origin in some form of religious incantation. The drum and these original songs are rapidly disappearing, but may still be occasionally heard in the solitudes of the wilderness, and generally in the dead of the night on the Height of Land.

June 24th. —This being Sunday, and my crew in need of rest, we remained encamped, although morally, I think, we would have been quite justified in going on, as there is no little probability of our running out of provisions before we can reach Long Lake and replenish our stock.

June 25.—Rising at 4 a.m., we got once more under way about 5 o'clock.

This lake cannot be less than ten miles, I think, in length; and appears at its greatest to be about four miles in width. The number of islands, however, prevents anything like a comprehensive view being obtained of it. The longer axis bears as usual about N.N.E. and S.S.W. Pursuing a direction between N.E. and E.N.E., diagonally across the lake, we came in about an hour to where the fifteenth portage takes off on the east side of the lake. This is, I believe, the Height of Land Portage on this route. It is about a quarter of a mile in length, and passes over a ridge 40 feet or so in height of drift gravel and sand.

It terminates at a small lake about half a mile wide. No rock was met with in place on our route through the large lake on which we were last camped, but numerous pieces of fossiliferous limestone were seen at the bottom and on the gravelly beaches.

The small lake north of the water-shed is, I think, a little higher than the larger one to the south, but not more than eight or ten feet. Crossing this small lake we came to its outlet, a small stream only a few yards in length, and running into another little lake. The water is very clear and many pieces of limestone could be seen in the gravelly bottom. A partial unloading or demi-charge was required here. Crossing this second small lake in an easterly direction we came in a mile to the commencement of the next or sixteenth portage. This is level and swampy, and in 250 yards brought us to a pond about one-third of a mile wide. This crossed, we landed and found ourselves still in a swamp. Here commenced our seventeenth portage, one of the longest and worst, not only on this route but any other I have yet passed over. It is about three miles in length, and for the most part over muskegs so wet and soft that the men with loads on their backs frequently sunk down almost to their knees. At the end of the first mile the portage is interrupted by a small pond which it was necessary to cross in the canoe, but the whole is reckoned as one portage. After making three stages, or about two miles, we camped for the night, my men being very much tired.

June 26.—Calling all hands soon after four o'clock, a hurried cup of tea and a bit of biscuit were taken, and once more they set to work on the portage. The chief difficulty was the canoe, which was much too large and heavy for the route. The black flies and mosquitoes, kept back by the cold spring, now seemed determined to make up for lost time, and harrassed us almost beyond endurance. About 9 a.m. everything had been got over, and we embarked on a small lake. We had not gone, however, more than half a mile when we came to another, the eighteenth portage. This was only, however, seventy-five yards in length. It terminated in a stream fifteen to twenty yards wide, the water of which flowed towards the east. This stream, on which we now embarked, proved very

crooked, swinging about from north to south, but pursuing on the whole an easterly course. The land here on both sides is low and swampy, but supports, nevertheless, a good growth of tamarac, many of which are sufficiently large for railway ties. In about an hour we arrived at the nineteenth portage. This proved to be a quarter of a mile in length, with a fall in the rapid of not more than ten feet.

This portage terminated at the western extremity of a deep bay, on the west side of Little Long Lake, the waters of which, like those of Long Lake itself, flow northwards into the Kenogami river, and finally, by the Albany river, into James' Bay. We had not proceeded far when Mr. Hamilton, who was taking and keeping a record of the courses for me, noticed a strong local attraction or variation of the needle. As it was just about noon and the day was bright and clear, I had no difficulty in satisfying myself that such was really the case, for the needle was deflected upwards of 90° from the proper point. Knowing that this must, in all probability, be owing to the presence in that vicinity of magnetic iron ore, and describing a circle around the upper end of the bay, noting at the same time the variation of the compass as we changed our position, I became convinced that there is a body of this ore in the bottom of the lake at that place. I examined several exposures of rock on the south-west side of the bay, and although I could find none of the ore, the formation and character of the rocks were such as are frequently associated with magnetic iron. We had proceeded thus for about three miles, keeping the south side of the bay, when we came to several small islands, on one of which (a mere rock) we landed for dinner. While I was examining the rock in places, one of my voyageurs picked up a loose stone and, surprised at its weight, brought it to me. I at once saw that it was a rich magnetic iron ore. Further search brought to light several other pieces, one of which was a mass of at least 70 or 80 lbs. weight. Nothing, however, could be seen of any ore *in situ* on the surface. Thinking that the ore might be under the surface of the water, and that the pieces in question had been detached and shoved up on the islet by the action of the ice, I made a careful examination of the north end, and was pleased to find my conjecture realized, and that the ore was evidently there "in place." I would have liked to have devoted a few more days to a more thorough examination of this interesting locality, but, owing to the difficulty of the route and the length of time occupied, our provisions were nearly exhausted, and it was necessary to push on.

On starting, our course was south-easterly, and four miles brought us out into the main lake, which is at this point from one to two miles in width. We now followed down this lake in a north-easterly direction for ten miles, and camped for the night on the west side.

The land bordering on Little Long Lake does not on either shore rise to any considerable height above the level of the water. Judging by the eye, it ranges from ten feet to fifty or sixty feet. The soil where I went ashore was a gravelly or sandy loam, and tolerably dry. There is a much less proportion of recently burnt land, and a greater proportion of green bush than on any other large lake I have so far met with. The timber is mostly aspen, not large, but healthy. There does not appear to be any considerable quantity of spruce, nor was that I saw of large size. There is a good deal of tamarac six to ten inches diameter. Black ash was noticed in several places, but it was not more than nine or ten inches in diameter and stunted. There is a mixture of white or canoe birch everywhere on the Height of Land, excepting on the muskegs and swamps. No red or white pine were observed. Mr. Gamsby, C.E., speaks in his Report of seeing a considerable tract of land on this lake fit for cultivation, the soil being a clay loam similar to that at Long Lake Post.

June 27.—Soon after we had started this morning we entered a marshy river, which, after following some two miles, brought us to a point at which the twentieth portage takes off. It is a mile long; has an easterly bearing, and terminates at a small stream. This portage passes over a muskeg or peat moss, and was so bad that it took the men four hours' hard work to get over it. Proceeding up this stream for a few chains we landed on the opposite side and commenced making another, the twenty-first portage, three-quarters of a mile in length and entirely over muskeg of the softest and worst kind. It terminated at a pond about a quarter of a mile in diameter. Having crossed over this pond, still another portage (the 22nd) was encountered. This is half a mile in length,

and passes over a dry ridge some fifty or sixty feet in height. There does not appear to be much if any difference of level in the twentieth and twenty-first portages, but in this, the twenty-second, there is apparently a fall of forty or fifty feet. It terminated at a good-sized lake. Here we camped for the night, having got almost everything over but the canoe.

It is unnecessary to describe the muskeg or peat bogs in which we have been floundering for some eight hours to-day.

On the drier ridge last passed over the soil is a sandy loam, containing a good many boulders. The timber mixed and healthy. The rock seen to-day has consisted of syenites, traps and slates of the Huronian Formation. Many small veins of quartz were seen, some of which contained iron pyrites and probably a small percentage of copper ore.

June 28th.—The lake on which we now embark is about half a mile wide, but of considerable length in a N.N.E. and S.S.W. direction. The banks are low and covered with tamarac, spruce, aspen and birch, but chiefly tamarac, which is seen of all sizes up to sixty inches circumference. Pursuing a north-easterly course for two miles, we landed on the east side of this lake, at what was to prove the last portage. The first half of this, the twenty-third portage, was well enough, but the timber on the second stage had first of all been killed by fire, and then fallen in all directions over the path. Leaving the canoe and all our baggage, excepting a few of the more portable articles, we were compelled to pass sometimes over, and sometimes under this confused mass of fallen tamarac trees, frequently stepping, jumping and scrambling from tree to tree without being able to set foot on the ground for as much as fifty yards at a stretch, and suffering greatly from the heat, which was very oppressive. Finally we came out on Long Lake in view of the Hudson's Bay Company's Post which was only half a mile distant on the other side of an arm or bay. Being speedily seen by some of the Indians at the Post, we were ferried over and hospitably received by Mr. Godchere, the gentleman in charge of Long Lake House. The distance from the mouth of the Sturgeon river, Lake Nipigon to Long Lake House, roughly estimated, is about ninety-three miles, and number of portages twenty-three.

June 29th.—The brigade from Pic with the Company's stores, and by which I expected our own supplies, has not arrived, and Mr. Godchere says that it will be at least a week before it can do so.

My voyageurs went back to day to bring our canoe and baggage which we had been obliged to leave behind owing to the impassable condition of the last portage. Mr. Godchere sent an Indian with them who knew of another portage which, although longer, was not obstructed with fallen timber, and by this our things were all brought to the Post this afternoon. Fortunately Mr. Godchere was able to spare us a week's provisions, more particularly pork, of which our supply was entirely exhausted two days ago. My guides from Nipigon were paid off and furnished with provisions and a small canoe wherewith to return home. They will start early in the morning and expect to accomplish the return trip in five days. We have taken ten days exclusive of Sundays, on which we did not travel. It was on the portages where we experienced the greatest delay; with very little more clothes than they carry on their backs, a single blanket each, a frying pan, small tin boiler, and a couple of tin cups or panikins and a small axe, only, portaging is minimised: One man takes the canoe on his shoulders, and the other takes the whole of the baggage and provisions, and they march straight over the portages and embark again at the other end with little loss of time, as compared with what takes place when three or four trips backwards and forward are necessary.

Letters were written and despatched by the returning men to be mailed at Red Rock.

June 30th.—The Hudson's Bay Company's Post, known as "Long Lake House," is situated at the north end of the lake. The ground on which it stands is from fifteen to twenty feet above the level of the water, and the land in the rear (or to the north) is low and flat. A point which stretches out into the lake for half a mile a little to the west of the Post, rises to the height of forty feet, and is composed of almost bare syenitic granite. The buildings consist of a tolerably comfortable dwelling house occupied by the officer in charge, a shop or trading store, a warehouse or store for provisions, and a couple

of small log houses for servants. Here the Indians occupy wigwams of birch bark even during the summer season, whereas on and near the coast of James' Bay, tents of duck or cotton are in almost universal use in summer. The clearing around the Post is only about ten acres in extent. The soil is a clay loam, and the first almost that I have met with since we left Lake Nipigon. This clay when tested with acids effervesces freely, and contains evidently a notable percentage of carbonate of lime.

Timothy grass, some of which has been introduced, grows well, and white clover, which I did not see, should also grow well, and would greatly improve the pasture. The marshes afford abundance of hay for winter. Only four head of cattle are kept, one of these an ox, said to have been raised at the Post, particularly attracted my notice on account of its fine size and condition. This ox measures eight feet in length from the setting on of the tail to the horns, five feet seven inches in height at the shoulder and ninety-four inches in circumference or girth behind the shoulders.

What crops can be safely grown here I cannot say from personal knowledge or observation. Potatoes are perhaps the only crop regularly grown, but these are, I understand, planted and come to maturity every year. They are very backward and late, however, this year, but I have no doubt that with proper seed and good cultivation, not only potatoes, but all the hardier grains and roots can be grown in ordinary years.

The following kinds of fish are found in Long Lake:—Whitefish, lake trout, speckled trout, pike—commonly called “jack-fish” by the Indians and Voyageurs—pickerel or dore, bass (striped), suckers, both red and white; marais or cat-fish, and silver fish before alluded to, as being probably a variety of whitefish. The sturgeon, although not found in the lake, is got a short distance down its effluent, the Kenogami River. The lake trout and whitefish, especially the former, are remarkably fine.

Of game of the deer species, the caribou or rein deer is most common, but still far from numerous, Mr. Godcheer, who is, I expect, a good hunter, killing only two or three in the course of the winter. The moose is still more rarely seen or killed. The red deer of Muskoka and other parts of Canada is unknown. Rabbits are very important here, as they are in most other parts of the territory, north of the great lakes, and their flesh often forms during the winter season, the principal food of the natives.

Of feathered game, ducks and what are erroneously called partridges, are the most common. Both plover and pigeon are very scarce on the height of land. Geese are only seen on their migrations to and from the north.

The furred animals are chiefly the mink, otter, beaver, lynx, fox, bear, marten and muskrat, the first and last being, I understand, the most plentiful in this district.

The following anecdote of a lynx, told me by Mr. Godchere, is worth recording. Accompanied by an Indian he was going in a canoe down the Kenogami river for some furs. It was not long after the ice had broken up, and the wild geese were migrating northward, alighting to rest and feed at favourite spots, as they crossed the height of land. Suddenly they came upon a flock of wild geese, whose attention seemed to be earnestly directed toward something on the shore. Concealing themselves under the bank, and approaching cautiously, they espied a lynx, which by its antics had strongly excited the curiosity of the geese. It was crouched on the bank close to the water, in such an attitude that while ready to spring on its prey, it was entirely hidden among the tall grass and reeds—with the exception of its hinder parts, and little stump of a tail. These were elevated so as to be seen by the geese, and jerked and wagged about with great rapidity. The flock meanwhile approached closer and closer, until they were within a few feet only, when with a sudden bound the lynx sprang upon one of the nearest geese, and quickly bore it off into the bush. Mr. Godchere was about to shoot at the beast, as it came ashore with its prey, but the Indian restrained him—indicating by signs that it would return shortly. The Indian was right in his conjecture; the lynx returned in a few minutes, and resumed its old position and tactics. Again the geese were lured on, and again the lynx sprang with lightning rapidity and unerring certainty on the nearest goose. They remained quietly watching this extraordinary performance, until the lynx had caught no fewer than four geese. It once more returned, but the remaining geese were by this time thoroughly alarmed and little inclined to approach, and the Indian thinking it was now his turn, took deliberate aim at the beast and shot it. On searching

a little way back in the bush the four wild geese were found, lying quite dead, but otherwise uninjured. The hunters thus secured both the lynx, which is prized by them alike for its fur and its flesh, and also its victims, the geese. The most remarkable thing in this incident is that a blood-thirsty and hungry creature like the lynx should be thus able to restrain and control its appetites, postponing an immediate and present gratification for some time, in order to secure a still greater good, conduct which would seem to imply the possession of reasoning powers, or of instinct so like reason as to be indistinguishable from it. It is quite possible the creature had young ones to feed at this time, and hence was under a strong impulse to secure for them as well as herself as much food as she could.

July 1st.—Sunday—The barometer fell rapidly last night and this morning, until at two p.m. it stood at 28.4 inches. Anticipating a storm I had my tent pegs driven firmly down, and the canoe secured. We had barely finished when a storm of wind arose from the north-east, and raged with a violence very unusual at this season of the year. Notwithstanding the precautions I had taken, my tent was blown down and I was compelled to seek refuge in Mr. Godchere's house. The atmosphere had a smoky appearance, as if a bush fire was raging at no very great distance, and the sun, although unobscured by clouds, was red and could be looked at with the naked eye without any great discomfort. About three o'clock in the afternoon, several Indians came to say that they observed very singular spots on the surface of the sun. On looking I saw these quite distinctly. Indeed I do not remember to have seen them so plainly, or so large before. Two spots pretty close to each other, and near the centre of the sun were particularly large, the longer axis of the bigger one seeming to be about one-thirtieth of the apparent diameter of the sun. A number of smaller spots were less distinctly visible in the lower right limb. This remarkable appearance continued for two hours, when the sun became entirely obscured by the thickness of the atmosphere. The Indians, both men and women, gathered around us, being as I suspected rather alarmed at the peculiar appearance of the sun, co-incident as it was, with the high wind and apparently approaching fire. Our coolness, and the curiosity only we appeared to manifest in the phenomenon, seemed to reassure and satisfy them that we did not apprehend any real danger.

July 2nd.—This afternoon I went with Mr. Godchere to see his potato field, about a mile distant from the Post. It is situated on a bay to the east of the Post, and was only cleared and fenced two years ago. The surface was flat, undrained and elevated but slightly above the level of the water. The soil is a cold, brownish clay, and contains (a most unusual thing) no calcareous matter. I take this to be a fresh-water clay, deposited by the lake when a little higher than at present. The potatoes, although planted nearly a month ago, are not yet up above the ground. The sets have, I think, been too deeply covered for one thing, and ground of this nature is cold and backward at any rate. The cultivation of heavy clay land, particularly if level and wet, requires both skill and capital. Where the seasons are short, warm sandy or gravelly loams are, I think, best for the crops of pioneer settlers. With a little care in the selection of seed, forcing in spring, drainage of the land, and good cultivation afterwards, there can be no reasonable doubt, however, that grasses, roots, and even grains of many kinds, can be grown in this climate, although it is, I am persuaded, inferior in some respects to that of Moose Factory on James' Bay. Moose Factory, it is true, lies a hundred miles or so further north, but it is a thousand feet lower than Long Lake House. Other conditions being the same, a difference of from 300 to 400 feet in elevation is, I believe, considered nearly equal to one degree of difference in latitude. This, if correct, would give Moose Factory an advantage equal to that which might be expected to be exhibited by a place at the same level nearly two degrees south of Long Lake House. But the proximity of Moose Factory to Hudson's Bay, and its exposure to cold north-easterly winds, lessens to some extent, in my opinion, the advantages of its lower position and better soil.

July 27.—I explored to-day the west shore of Long Lake from the Post to what is called "the Narrows," and on my return examined the opposite or eastern side. The rocks are syenite, quartzite and Huronian slates. The strike of the slate rocks appeared to be north-easterly, and the dip is towards the north-west. The greatest elevation attained would seem to be about 100 feet above the level of the lake. I discovered no minerals

of any economic value, but found many pieces of fossiliferous limestone on the east side of the lake.

The timber is mostly aspen, of which there is a good deal on the west side.

At "the Narrows" we saw the first wild pigeon met with on this trip. I cannot account for their scarcity on the Height of Land at this season, or understand where the great multitudes of these birds that are frequently seen going north stop to breed. It is certainly not between the great lakes and James' Bay, or I should have seen many more of them. It is at the Narrows where the Hudson Bay Company's fishermen have their lines set to catch lake trout, some of which weigh upwards of twenty pounds, and are of remarkably fine quality. On my return the Company's men were digging post holes for a fence, and I obtained several samples of clay from one to three feet or more in depth. On testing I found them to be without exception highly calcareous.

Having seen all that was of interest in the immediate vicinity of the Post, I concluded to go and meet the brigade from Pic, and get the supplies which I expected by it, and then be in a position to resume my journey northward sooner than would in all probability be the case if I waited their arrival at Long Lake. The progress of the brigade, composed as it is of heavily laden boats, is necessarily slow. I should have liked to have explored Long Lake from end to end, but this has been done already, as regards its geology, by Dr. Bell; and by Mr. Beatty, P.L.S., for the Crown Land Department, in 1870.

The following extract from Dr. Bell's report will be interesting to those who have not seen it :—

"KENOGAMI OR LONG LAKE.

"The southern extremity of Kenogami or Long Lake is about twenty-two miles due north of Jackfish Bay, opposite the Slate Islands. The Height of Land between the waters of Lake Superior and those flowing into Hudson's Bay, passes about one mile south of this point, or twenty-one miles north of Lake Superior. Long Lake, for the first eight and a-half miles, runs nearly due north. The breadth in this part varies from two to forty chains, and averages about twenty. From this point to the outlet its course runs nearly straight, bearing N. 30° E. (ast.); so that its general bearing, from one extremity to the other, is about N.N.E. The average breadth of the main section, forty-six miles in length, found by taking the mean of fifteen measurements, at equal distances, is 104 chains, or a little over a mile and a-quarter. Following the axis of the lake, the whole length will therefore be fifty-four and a-half miles, while in a straight line between extreme points it is fifty-two miles. As already stated, the shore line measures 192 miles, exclusive of islands. The following are the principal streams which enter Long Lake :—

"1. Hanes River, on the west side, at eight and a-quarter miles from the southern extremity.

"2. Ka-we-saqua-ga-ma, or Paint River, which enters the same side from the south-westward at two miles north of Beatty's line.

"3. Ka-muck-a-ti-wa-ga, or Black-water River, which enters the same side from the north-westward, three miles north of Beatty's line.

"4. Kinonge, or Pike River, also on the west side, eight miles from the outlet.

"5. Making-Ground River, on the east side, one and a-quarter miles from the outlet.

"The valley of Black River, and the southern part of Long Lake, form one continuous depression running due north and south. Its sides are lined with long moraines, composed of well rounded boulders. Numerous ponds lie amongst these in the lower levels. Black River takes its rise in a chain of these ponds, connected together by short links of sluggish water; the northernmost pond being only a little over a mile south of Long Lake. This route can be followed in small, light canoes to Lake Superior; but is never attempted by larger ones on account of difficulties in the navigation of Black River. The country around the southern part of Long Lake is rugged and mountainous, with very little covering of any kind upon the hard gneiss rocks. What appeared to be the highest of these hills, lies a distance of two and a-half miles west of the extremity of the lake, and is, by barometrical measurement, 540 feet over the level. Going northward the hills become gradually lower, until about half way down the lake (or at thirty miles

on the west side, and twenty-four on the east, from the outlet), the country has assumed a comparatively level aspect, with an occasional hill from fifty to one hundred feet high.

"The line run last summer by Mr. Walter Beatty, P.L.S., south-easterly from Lake Nipigon intersects the west shore of Long Lake at fifteen and a-half miles from its southern extremity, or twenty miles north of Herrick's line. The latitude of this point, from the mean of several observations both of the sun and pole-star, I found to be $49^{\circ} 22' 30''$. Around the southern part of Long Lake, and as far north as Beatty's line, the prevailing rock consists of the common variety of gneiss, with the usual W.S.W. strike. But from this point to within eighteen miles of the outlet, a very coarse, light reddish grey granite prevails. It is composed of whitish quartz and very large crystals of light coloured feldspar, with occasional flakes of mica. At the above distance the tender gray mica-schists, similar to those of McKay's Lake (and also cut by the same kind of granite veins), begin and continue for about two miles down the shore. Near the termination of the two miles referred to, finely grained, highly fissile mica-schists make their appearance, and are almost continuously exposed for about eleven miles along the east side, and for about the same distance (or to the Kin-onje River) on the west side. They stand nearly on edge all along, the strike gradually changing from about N.W. on the southern to S.W. on the northern side of the above breadth. The prevailing colour is dark greyish-green, but some considerable bands are yellowish-gray and olive-coloured, with a talcoid aspect. The north-eastern strike of the northern limit of this mica-schist formation continues to the Making-Ground river, which it intersects at about two miles in a straight line from its mouth. In one place on the east side of this narrow part of the lake ordinary gneiss running S. 70° W., and dipping northward at an angle of 45° , is seen below the fine green mica-schist. A small island in the same neighbourhood is composed of a rock resembling the imperfect grey gneiss of Hollow-rock Lake and other localities already mentioned. It runs S. 70° W., is hard, fine grained, grey, silicious and somewhat micaceous, and contains numerous small patches and short cross veins of white quartz. Northward from the limit of the greenish mica-schists just described, the shores and islands of Long Lake are occupied by a massive, reddish grey, rather coarse-grained syenite, composed of translucent quartz, white and red feldspar, and dark green hornblende, with a little black mica. The same rock continues to be exposed in the hills on either side of the English river, as far down as the first portage."

FROM LONG LAKE HOUSE TO PIC RIVER POST.

July 4th.—Mr. Goodchere having obtained a guide for us, we started about half-past three in a canoe belonging to him which was a good deal lighter than our own. Half an hour's brisk paddling on an E.S.E. course brought us to the mouth of the Making-Ground river, a sluggish stream about two chains in width, but which contracted as we ascended, until at the end of three miles it was little more than ten yards in width. We continued our ascent of this little stream on a southerly course for about eight miles when we camped, it being now seven o'clock. The country passed through is for the most part a tamarac swamp, with low, bare rocky knolls and reefs here and there projecting above the generally level surface.

The tamarac is sometimes of useful sizes on the drier parts of the swamp, but much of the timber has been destroyed by fire.

July 5th.—Leaving camp, about a mile and a half brought us to the first, or Summit Portage, which is nearly two miles in length. This portage crosses the watershed and terminates at a lake called Mud Lake, the waters of this lake flowing into Lake Superior, and those of Long Lake into James' Bay. The ridge where passed over on this portage is nearly seventy feet in height, but there is another portage over which the boats employed by the Hudson's Bay Company are hauled, and where this dividing ridge is much lower, if not almost level. Mud Lake, on which we now embark, is about four miles long and one-quarter to one-half a mile wide, and if anything a little higher than Long Lake. Having passed this one on an E.N.E. course, we enter a small and very crooked stream which we follow down on an easterly course for about a mile, when we enter another lake

which is crossed in a S.S.E. direction, bringing us in half a mile to the outlet. This is a very serpentine stream, but has a general bearing of south, and in another half a mile it enters an arm of a very irregular but seemingly large lake called, I believe, McKay's Lake, which we traverse in various directions, but on the whole eastward for twelve and a half miles. We now come to the river Pic which carries off the waters of these lakes. It is here from one to two chains wide, and also very crooked. We had only just entered this when a short demi-charge was necessary, but did not occasion much loss of time. At the end of nine miles, on an average course of S.S.E., we camped, having made about thirty-one miles to-day. With the exception of the last stretch of nine miles, the country, as seen from the canoe route to-day, has been on the whole, rocky and barren. The land on the banks of the river is sometimes low and swampy, and in others dry and sandy. On the first the timber is chiefly spruce and tamarac, and on the dry sandy land, banksian pine of small size. The drier land might be converted into tolerable pasture, and much of the lower ground would, if cleared and drained, make good meadows.

July 6th.—In three miles after leaving this, our second camp, on a S.S.E. course, we came to a rapid with a fall of about five feet, where on the upward trip a portage would most likely be necessary, but which only requires a demi-charge on the downward trip. In other three miles we entered a small lake about three-quarters of a mile in length. At the end of this lake another demi-charge was made. Below the rapid, which makes this demi-charge necessary, the route passes through another little lake, on the east side of which there is a curious detached rock. Course still S.S.E. One mile and a quarter of alternate lake and river brought us to another demi-charge, the portage around which was only about 200 yards in length. In the next five miles we passed four small rapids where it was necessary to portage more or less most of our things, but down all of which the canoe with some of our baggage was run. Between the last of these demi-charges and the second regular portage, which occurs at the end of this stretch, we met the long-looked-for brigade from Pic. It consisted of three boats, each capable of carrying about three or four tons, and the whole manned by about twenty men. On enquiry we were greatly disappointed to find that they had nothing for us, and I at once determined to go on with all speed to Pic, which we hoped to be able to reach in two days.

The portage at which we soon after arrived was quarter of a mile in length and fall about twenty feet. From this to the third portage was not more than three-quarters of a mile. The fall here was twenty-five feet, and length of the portage half a mile. Again embarking, we had not proceeded more than half a mile when we came to the fourth portage, called "the Long, or Dying Portage." This is two miles in length and the fall as indicated by my barometer, is about 105 feet.

Crossing this, and resuming our journey in a direction generally ranging from S.E. to S., three miles more brought us to the fifth or Sand Hill portage. This is a quarter of a mile in length, with a fall in the river of nearly one hundred feet, the greater part of which is taken in one or two jumps. This is much the finest fall on the Pic river. So steep is the portage at the lower end, that the Hudson Bay Company have found it necessary to erect a capstan and permanent rollers, by means of which their boats are hauled up. Two miles and a half below this we came to the sixth portage, about one hundred and fifty yards across, with a fall of about thirty feet. On this portage, being now late, we camped for the night, having made about twenty-three miles since we left the last camp.

July 7th.—This morning when I called the men, at four a.m., the thermometer was one degree below freezing, and damp clothes left on the ground were frozen quite stiff; indeed there was a little ice in one of our tins. Soon after leaving this portage a considerable tributary joins on the east side. From this junction the course of the river, which has hitherto been more or less east of south, becomes more westerly, or say S.S.W. to S.W. The river is here thirty or forty yards in width, with a deep, strong current. Ten miles down stream brought us to the seventh and last portage. The length of this portage is only one hundred yards, and the fall in the river forty feet. Leaving this at a few minutes past eight o'clock a.m., we met with no further obstruction, and reached the Hudson Bay Company's Post, at the mouth of the river, at 10:30 p.m. The distance from the last or seventh portage to the Post, following the turns and bends of the river, I esti-

mated at not less than fifty miles, or say sixty miles from our last camp. The river, however, is one of the most crooked I have ever been on, and the distance in a straight line, or as the crow flies, is probably not more than two-thirds, or at most three-fourths of sixty miles. Dr. Bell estimates the distance at upwards of seventy miles by the river. The officers and servants of Hudson Bay Company's Post having all retired to bed, we did not disturb them, but camped for the night.

July 8th.—This being Sunday, was truly welcomed by my tired voyageurs as a day of rest.

On making enquiry I was glad to find that our pork and flour had come. Indeed they had arrived, as was expected, before the departure of the brigade for Long Lake. But unfortunately the letter to the officer in charge, telling him when, where, and how to forward them, did not reach him until three days after the brigade for Long Lake had left.

July 9th.—As the mail steamer was expected to-day, and we had some arrangements to make, I concluded to defer our departure until to-morrow.

July 10th.—The steamer did not arrive until this morning, and then, greatly to our disappointment, brought no mail. Taking leave, therefore, of Mr. and Mrs. Spence, whose kind hospitality we had enjoyed, we started off about two o'clock on our return to Long Lake.

It is not necessary to go into the particulars of our return trip, further than to say that, although with a light canoe we had been able to accomplish the down trip in three days and a half, we soon found that with a heavily laden canoe and a strong current against us, we were likely to take at least twice as long to get back again. Indeed it required three days to get over the stretch that had been made in our last day's journey coming down and, with all due diligence it was the evening of July 16th when we reached the Height of Land, or Summit Portage. Whereas only seven portages were needed one way, some eighteen had to be made on the up trip.

On this last portage we found Mr. Godchere encamped with the brigade, and almost all the Indians we had seen at Long Lake House. They were on their way, the brigade for another load of supplies, and Mr. Godchere on business. Many of the Indians were going down to get their annuity from the Indian Agent, whom they expected to meet at Pic. As it had been raining all afternoon, and my men were both wet and tired, we camped here also. In consequence of this wholesale exodus of the Indians, I had serious misgivings as to the possibility of obtaining guides at Long Lake to take us on to English River Post. The Indian whom Mr. Godchere had expected to accompany us had altered his mind, and was now with the rest on his way to Pic, and could not be persuaded to return.

July 17th.—A very miserable wet morning, and even the Indians, anxious as they were to get to Pic, did not seem inclined to make an early start. It cleared up a little, however, about ten a.m., and at twelve, with the assistance of some of the Indians, we had got all our things over the portage, which, as already mentioned, is nearly two miles in length. I found bits of fossiliferous limestone in crossing, on the very top of the dividing ridge or Height of Land. The watershed here is at least 1100 feet above James' Bay or the level of the ocean, Long Lake itself being 1066 feet above the sea.

Embarking on Making-Ground river, we reached Long Lake House at five o'clock in the evening. The distance by this route from Pic Post to Long Lake House is about 123 miles.

The country lying between the north end of Long Lake and Lake Superior, as seen on the route I have followed, may be divided into two sections or parts, in each of which the physical features and soil differ materially from the other.

The first is that comprised between Long Lake Post and the Dying Portage.

The second between Dying Portage and Pic, on Lake Superior.

That section of the country situated to the north of Dying Portage is a part of, and belongs to, what I have in former reports called the Plateau, lying between the Great Lakes and James' Bay. The elevation of this plateau will average about 1,000 feet above the level of Hudson's Bay, ranging from 800 to 1,400 feet, as about the extremes.

It embraces a large extent of territory on both sides of the water-shed, but more

particularly on the north side. The character of the country and the soil is better generally on the north than the south side of the water-shed, but there is usually a belt varying from a few miles only to fifty miles or more in width, of a poor, stony, sandy or swampy character, at or about the water-shed, beyond which to the north there is a belt of much more fertile land. With exception of the land about Long Lake Post itself, the country from thence to Dying Portage is, on the whole, poor both in respect of soil and timber, as seen on this route. Standing on the summit of the Long or Dying Portage and looking southwards, a good view of the country is obtained for six or seven miles around; or more properly embracing a semi-circle from east to west, by south. Two features can hardly fail to strike the spectator. First of all, the comparative smallness of the whole area, that appears to be bare rock. Secondly, after encountering lakes everywhere on the Height of Land, one cannot but notice their sudden disappearance. It would seem to me that, during the Glacial epoch, the ice, laden with the spoils of the softer Devonian rocks from the basin of Hudson's Bay, has worn great channels in the Huronian and Laurentian rocks, extending not only across the Height of Land where these channels, as Dr. Bell observes, often form the depressions now occupied by lakes, but has excavated numerous gorges leading down from the Height of Land to the coasts of Lakes Superior and Huron. The width and depth of these gorges has no doubt varied with the hardness and nature of the bed rock. But the depth ranges in general, I think, from one to two hundred feet, and in some cases even more. After these gorges and channels had been formed on the Lake Superior slope, it would further seem that they had been filled with the gravels, sands and clays of the so-called drift period. This happened towards the conclusion of the Glacial epoch. The whole surface, with the exception of the highest ridges, has most likely been more or less deeply covered with this drift.

All the principal rivers have their sources on the Height of Land, and the descent, especially of those which flow southwards, is exceedingly rapid. Thus, in the Pic river, commencing at the second portage, about two miles above Long or Dying Portage, and terminating at the lower end of the sixth portage, eight miles below, there is a fall roughly estimated at something like 300 feet, or thirty feet in a mile. This is an extreme instance, but anyone who has given the least attention to the effect of running water on banks of sand, clay or gravel, will be able to form some slight conception of the excavating and transporting power of a great body of water, such as is contained in many of these rivers, with a fall like that we have here. Thus we find, as might be expected, that the Pic river has in this stretch, and for many miles below it, cut its way down through the drift to a depth of from 100 to 150 feet, heavy banks of this material appearing sometimes on one side and sometimes on the other, and its downward course has been only finally arrested by the bed rock of the original glacial trough. Thus it is, I conceive, that this and various other rivers have been constrained as it were to follow the glacial troughs or channels to which I have alluded. This trough, as seen from the river and from the few ridges which I ascended, would appear to be from one to two miles in width. Down this channel the water of the river pursues its way, not in a straight, but in a zig-zag or serpentine course, swinging backwards and forwards from east to west within the limits prescribed by the rocky sides of the trough. Prodigious quantities of the drift have been washed down by the water of the river and its tributaries. Some of it has been deposited again, forming bottom land, but the far greater part has no doubt been carried out into Lake Superior. The great banks of sand at the outlet of Pic river have obviously, I think, come from this source.

What the surface may be like east or west of the narrow valley of the Pic river, I am unable to say, but within the valley itself there is more land, and land of better quality, than I had any expectation of seeing. In some places the soil is a sandy, and in others a clay loam, and although the arable land may be confined to limited areas, nearly all of it will make good pasture. The C. P. Railway is expected to cross Pic river some three miles from the mouth, and will no doubt lead to early settlement on the better lands found on this river, as far up as the first fall, some fifty miles or so from Lake Superior.

The timber consists of spruce, cedar, tamarac, balsam, canoe birch, poplar and aspen. I did not notice either red or white pine. Both the willow and the alder grow luxuriantly,

and fringe the banks of the river in many places. Some of the spruce and tamarac are of fair size.

The rock met with is chiefly Laurentian, and I saw no strong indications of its being likely to contain veins of valuable metallic ores.

From ice marks I infer that the river is much flooded in the spring, the water evidently rising in some places at least twelve or fifteen feet above its ordinary summer level.

Settlers, especially immigrants, who are strangers in the country, cannot be too careful in ascertaining before selecting their lots and particularly the sites for their houses, the extreme height to which the waters of the adjacent rivers may sometimes rise, especially in the spring, and they should be guided by their own observation and judgment rather than by the statements of interested parties owning, and possibly anxious to sell them, the fertile but low-lying alluvial land situated on or near such rivers.

In view of the great additional interest attaching to the country north of Lake Superior, in consequence of the construction of the Canadian Pacific Railway, the early completion of which is now seemingly assured, I feel justified in quoting from the reports of Dr. Bell, Assistant Director of the Geological Survey, such information in reference to Long Lake, and the valley of Pic river, as will, I think, be acceptable to many who may not be able to obtain these reports for themselves. In 1870 Dr. Bell with a strong party visited and examined this section of the Province and made careful topographical and geological surveys of many of the lakes and rivers, full details of which will be found in the Report of Progress of the Geological Survey for 1870-71.

Dr. Bell has the following in regard to Pic river:—

"The Indian name of this stream is Peekting, or the Muddy river, so called from the large quantity of light-colored clay which it holds in suspension along its lower reaches on the melting of the snows, and after every shower of rain. It rises in McKay's Lake near the Height of Land, and enters Lake Superior near its north-western angle. From its mouth to the junction of the Black river, the breadth is about 700 feet, but above this point it contracts to between 200 and 300 feet, and becomes gradually narrower all the way to McKay's Lake, where it is less than 100 feet wide. The general upward course for the first twenty-one miles is almost due north. At the end of the second stretch, which is twelve miles long, bearing N. 30° E., we arrived at Herrick's line; thirty-one miles in a direct course from Lake Superior, or forty-five miles by the river. The third stretch lies between Herrick's and Beatty's lines, and is twenty-one and a half miles long, bearing N. 15° E. The first three portages occur in this section. From the intersection of Beatty's line the upward course curves round till it has assumed a W.S.W. course. The fourth stretch (seven and a-half miles between extreme points), includes the fourth, fifth and sixth portages, and terminates in the south-west angle of Waboosekon or Rabbit Lake. This lake has the form of the letter "L," each arm being two miles in length. The fifth section bears due north, with a length of twelve miles from the angle of Waboosekon Lake; it includes portage seven to fifteen, and passes through five small lakes. From the upper extremity of the fifth section, the upward course curves to the left, till at the end of six and a half miles, in a straight line, it has assumed a westerly direction, at the outlet of McKay's Lake. Half a mile below this lake there is a small rapid which occasions the sixteenth portage. The valley of the Pic will average about one mile in breadth. On either side, rounded hills of Huronian and Laurentian rocks are seen rising to heights varying from 100 to 400 feet, the more elevated being nearest Lake Superior. Below the third fall (which is fifty-three and a-half miles in a straight line from Lake Superior), the valley is everywhere filled with clay and sand, arranged in terraces, the most marked of which are at ninety and 150 feet over the river; the latter being the average elevation of the highest banks. These deposits are very much cut up by deep ravines, giving the valley an extremely uneven bottom. Clay prevails in the lower part of the deposit, and fine sand towards the top. The clay occurs in thin layers (usually from half an inch to two inches in thickness, and averaging about an inch) of a bluish-drab colour, interstratified with lighter beds of a fine sandy character; the whole having a conspicuously banded appearance. The bedding is usually horizontal, but occasionally it is tilted or

contorted. Layers of cemented gravel were sometimes met with. The clay is highly calcareous; Dr. Hunt finds the various samples collected in different parts to contain on an average upwards of thirty per cent. of carbonate of lime. The gravel and coarse sand consist, to a great extent, of the *debris* of limestone rocks, apparently derived from the calcareous strata north of the water-shed. These deposits appear to be of fresh-water origin. On the east side of the river, at a point about nine miles below Herrick's line, in a bed of bluish-gray sand, underlaid by clay, and overlaid by fine yellowish sand (at a height of thirty feet above the river, and thirty feet below the top of the bank), I found two species of the genus *Unio*, one of *Anodonta* and one of *Margaritana*; together with species of *Muoca*, *Planorbis*, *Valvata* and *Ammicola*; the whole being of a more southern type than the mollusca at present inhabitating the rivers and lakes of the neighborhood. All the way from the mouth to the first portage, a distance of forty-four miles in a straight line, or sixty-three following the stream, the river flows swiftly, with a smooth gliding current, which greatly impedes the upward progress of canoes, especially when the water is high. A few slight rapids, mostly over boulders, also occur, and in going up it is necessary to "track" loaded canoes past some of these with tow-lines. In this distance, steep banks of clay and sand rise, on alternate sides, to heights varying from thirty to 150 feet. Owing to the undermining action of the water, the banks in many places have given way, and precipitated great masses of the clay into the bed of the river, blocking up the stream and forcing it to excavate for itself new chonnels. These land-slides are occasionally upwards of an acre in extent. Below the first portage, the river averages about five feet in depth at low water, and from ten to fifteen when the water is high. The trees all along the banks are marked by the ice shove, at a height of from twelve to fifteen feet above the summer level, and the river-silt is deposited on the bark and moss of their trunks in places as high as twenty-five feet over the same level. During low water the banks are very steep and muddy, and thickly covered with brush, so that it is difficult to find good landing places for canoes."

FROM LONG LAKE HOUSE TO ENGLISH RIVER POST.

July 18th.—As anticipated, I found it impossible to obtain a suitable guide at Long Lake, although Stephen White, who was temporarily in charge of the Post during Mr. Godchere's absence, did all that was in his power to assist us. Finally, he concluded to accompany us as far as a lake on our route, where it was expected an Indian would be found who might be induced to go with us. This lake was reported to be about twenty-five miles from Long Lake House. Two youths of about 19 and 15 years of age also went with us, as a last resource, should we be unable to find the Indian referred to.

Starting in the afternoon, about half an hour's paddling on a north-easterly course, brought us to what we may assume to be the end of Long Lake, but for the next hour we passed through a great marsh, on courses varying from east to north; it is difficult to decide whether this marsh belongs to the lake or river. We now enter, however, what is plainly the Kenogami or English river, the outlet of Long Lake, and a tributary of the Albany. In size, it is here a stream of about two chains in width. Ten minutes more and we came to the first portage, about 350 yards in length, with a fall in the rapids estimated by Dr. Bell at twenty feet.

Leaving this portage, forty minutes' brisk paddling brought us to the junction (from the west) of Little Long Lake river, which is seemingly nearly as large as the Kenogami itself. In twenty minutes more our river was joined by another good-sized stream also from the west, called the Manitou-namaig, or Devil-fish river. Half an hour after we had passed this junction we came to the second portage. The fall here is only seven feet, and the length of the portage 150 yards. The first portage is on the west, and the second portage is on the east side of the river. Here we camped for the night. This point is, I consider, about ten miles from the Hudson Bay Company's Post on Long Lake, following the windings of the river. The country is low and flat, and there is a very extensive marsh between the Post and the first rapid. This might be converted into meadows at a

small expense, and will be valuable for that purpose some day or other. The size and condition of the few cattle kept at the Hudson Bay Company's Post, leaves no room for doubt as to the fitness of both soil and climate for the raising and keeping of cattle. The ox whose dimensions were given a few pages back is a sufficient proof of this, and with an unbroken stretch of water, navigable for steamers from this point to the south end of Long Lake, not more than twenty-two miles from the Canadian Pacific Railway, and the same distance from Lake Superior, offering competitive or alternative means of transport to eastern markets, I cannot admit that I am at all visionary in believing as I do, that this country, barren as the soil, and inclement as the climate may appear to many, will undoubtedly be reclaimed, and settled at no distant day. The population may not be dense, but when we consider the immense extent of this Height of Land plateau, and that it possesses a soil as well if not better adapted for pastoral pursuits than most parts of the Highlands of Scotland, it may become of very much greater importance than we imagine, more so, indeed, than some of our richer but at the same time much smaller home districts.

Dr. Bell ascended and explored the lakes drained by the Manitounamaig, which, as just mentioned, joins the Kenogami some two miles above this portage. He reports as follows in reference to the country lying to the north-west of Long Lake House: Report of progress of the Geological Survey, 1870-71, p. 341, *et seq.*

THE COUNTRY NORTH-WEST OF LONG LAKE HOUSE.

"The Manitou-namaig river enters the Kenogami river at six miles in a straight line from the outlet of Long Lake. Canoe navigation is interrupted by a rapid close to the mouth, around which there is a portage, on the north side, of twenty-six chains. The upward course of the river is north 57° west (Mag.), four miles to the lake of the same name, the river in this distance being broken by a few rapids, with boulders, which, however, do not necessitate portages. This lake has the form of the letter "L" reversed. The lower portion, which is about six miles in length, with a breadth varying from three to 110 chains, runs north-west; while the upper portion, which is said to be over twelve miles long, runs south-west, and varies from twenty to about 100 chains in width. The upward continuation of the river leaves the northern extremity of the lake at the angle formed by the two stretches described. Following this, through a sluggish stream, at the end of half a mile we come to Round Lake, about two miles long. The course of the river above Round Lake is about west, for five and a-half miles; entering Arm Lake, one mile in diameter, at the distance of about a mile from Round Lake, and terminating in a shallow lagoon, half a mile wide, above which the main river turns south-westward, and was not explored any further. The above stretch consists of dead water, with the exception of a slight chute a short distance above Arm Lake, but this is passed without portaging. A very crooked stream, called Mink Brook, enters the river half a mile below the lagoon. Following up this, at about two and a quarter miles in a straight line, we came to Muddy Lake, which is two and a half miles long, and one mile wide. Only one slight chute occurs in the course of Mink Brook, and even here a portage is unnecessary. At a bay on the west side of Muddy Lake a portage three quarters of a mile long, runs south-westward to Springwater Lake. From the northern extremity of Muddy Lake a still-water brook, half a mile long, led us to a pond called Head Lake. From Head Lake a portage-trail runs north-westward a mile and a quarter, mostly over swampy ground, to the lower part of Fleming's Lake, on the Ka-wa-kash-ka-ga-ma river, another branch of the Albany. Fleming's Lake (so named after the chief engineer of the Intercolonial railway) runs N.E. and S.W., and is five and a half miles long, by one mile and a half wide, with the exception of a narrow part in the middle. The outlet at the north-east extremity breaks through a ridge of boulders, producing a rapid, but below this the river is smooth to Ka-wa-kash-ka-ga-ma Lake which lies about a mile and a half to the north, and is three miles long by two wide. The river discharges from the north-west angle of this lake and flows smoothly in a westward course for a considerable distance. At two miles

below the lake a portage trail three quarters of a mile long, runs from the river northward to a beautiful sheet of water called Wa-wong Lake; which discharges into it by a small brook, in the same neighbourhood. Wa-wong Lake is of a very irregular form, but its general outline will probably measure six miles from east to west, by three from north to south. According to the sketch-maps, and descriptions which we received from the Indians, the Ka-wa-kash-ka-ga-ma river, after flowing a considerable distance westward, turns northward, passing through two lakes, and finally runs eastward to the Kenogami. This great bend in the river sweeps round Os-kan-a-ga or Bare-Bones Lake, which is said to be one day's journey by canoe (or about twenty-five miles) in length. Below the lakes just mentioned the river is called Pe-geon-a-kai-geon, after the lowermost of the two lakes. This route is sometimes used by the Indians in coming from the Albany to Long Lake House, the amount of portaging being less than in following the Kenogami river the whole distance. A few miles below the trail to Wa-wong Lake, a branch, which the Indians follow going to Lake Nipigon, is said to enter the Ka-wa-kash-ka-ga-ma river from the southward. The upward continuation of the river is found at the south-western extremity of Fleming's Lake. Spring-water Lake lies about a mile and a half south of this part of the river, into which it discharges by a small stream, and measures three and a half miles in length, in a north-easterly direction. Six other lakes, connected with the same water, are found at short distances south-west of Fleming's Lake. One of these is over three and another over two miles in length. Following up the main river, at about nine miles in a straight line south-west of Fleming's Lake, we enter Mountain Lake, which has the same general bearings, and is three and a half miles in length. A rapid, about a mile above Mountain Lake, interrupts canoe navigation for the first time in the thirty-one miles of this river and its chain of lakes which we examined; while below the point reached by us, opposite Wa-wong Lake, the Indians informed us that no portage occurred for a long distance. The whole country explored in connection with the Manitou-namaig and Ka-wa-kash-ka-ga-ma river, is comparatively level. Here and there a gneissoid hill is seen rising one or two hundred feet above the general surface. The most remarkable is Granite Mountain, on the south side of Mountain Lake, which is composed of granite or massive gneiss, and has an elevation of about two hundred feet over the lake. This region is overspread with a fine yellowish sand, beneath which a considerable thickness of gravel is found in some places, and, underlying all, a light-coloured clay is occasionally seen. The sand and gravel are largely developed around Wa-wong and Fleming's Lakes, whose banks are from fifty to one hundred and fifty feet in height, the shores consisting of smooth, curving sandy beaches. Back from these lakes the surface of the country is rolling, and the soil generally of a light, sandy and gravelly character. The wood consists of white birch, aspen, tamarac, spruce, balsam, fir, white cedar and the banksian pine, or "cypress," many of the trees being large enough to be of value for timber. A country similar to the one just described is reported to extend in the neighbourhood of the Height of Land westward to Lake Nipigon, and eastward to New Brunswick House, on Moose river. As illustrating the general level nature of a portion of this region, I may refer to the fact that we did not find it necessary to make a single portage in going all the way from the English river to Head Lake, except the short one already mentioned at the mouth of the Manitou-namaig river; while the outline of the country on either side of this river and the lakes was usually low and level. As already stated, no portage occurs along the Ka-wa-kash-ka-ga-ma river in the part examined (about thirty-one miles), or for some distance further down. The rocks met with in the country explored north-west of Long Lake House consists of Laurentian gneiss, with some black mica-schists. The general strike is west south-westerly, the same as throughout the extensive regions already referred to."

A country such as Dr. Bell describes—well watered and well timbered, with few hills or ridges of rock, cannot fail to be a good grazing country. Nor will there doubtless be wanting numerous tracts of land sufficiently fertile to produce abundant crops of such grains and roots as the climate favours.

July 19th.—Started at five a.m., at which time the barometer stood at 29.15 inches.

A quarter of a mile from this second portage brought us to a strong rapid with an island on the right. Hornblendic gneiss is seen here, intersected by granitic veins;

river four chains in width; country flat and low-lying on both sides; timber chiefly spruce and tamarac. At 5.30 rapids again, which we ran. About this point, the course of the river hitherto northerly, turns eastward, and at 5.50 a.m., or say in about three miles from camp, we came to the third portage. This is on the left bank, and 240 yards in length. The fall in the rapids is twenty-two feet, according to Dr. Bell's measurements.

The highest of the falls, and even the length of the portages, often vary with the state of the water, whether it be high or low. The estimates, therefore, of two parties passing over the same route at different seasons will occasionally be found to disagree on these points.

At the lower end of this portage I noticed several pieces of fossiliferous limestone, similar to those met with elsewhere in the Height of Land. Having crossed the portage, and stopped to take breakfast, it was eight a.m. when we again resumed our journey. The river is now three to four chains in width, and pursues a course varying little from E.N.E. in long straight stretches. Some small black ash and bush maple now appear, mixed with the more common woods. The rock is Laurentian gneiss, and dips northward. About three-quarters of a mile below this portage a stream falls in on the left, and a little lower down another on the right. A short distance below this we meet with a rock ridge or bluff forty feet in height, with seemingly good land on the left. Stopped to examine, and found the soil to be a rather light sandy loam. In another mile we have a strong current in the river, with frequent rapids. About three miles from last portage a good large stream falls in on the left side. This is called Kaw-wah-que-ne-qua. The water of this stream is much clearer than that of the Kenogami river. A little lower, and we come to a rapid and the fourth portage. This is distant about three and a half miles from the last or third portage. It is on the right hand side, some 200 yards in length, with a fall of twenty-five feet according to Dr. Bell's measurement, which is, however, more than was indicated by my instrument.

Starting at 9.33 a.m., five minutes brought us to the fifth portage, on the left, over a rock some twenty yards only in length, with a fall seemingly not more than five feet. In eight minutes from the time we got away from this portage we came to the next or sixth portage. This is only a demi-charge, the portage being some 150 yards in length, and fall, say about four feet. Starting again at 10.12 a.m., a small stream falls in on the right. On this, the south-eastern side of the river, the country has been burnt over and is level or rolling with a light sandy soil. Stephen White, who has traversed it on foot, informs me, that this is the character of the land for a long distance in an easterly and south-easterly direction. Eighteen minutes, in which we probably made about a mile, brought us to the seventh portage. This is on the right hand side, nearly half a mile in length, and the fall, according to Dr. Bell, is twenty-four feet, which, however, is considerably less than that indicated by my barometer. Timber here all destroyed by fire. The soil appears to be a light clay loam. Black ash grows on a small island opposite the lower end of this portage.

Having stopped to take dinner here, it was about two p.m. when we once more got under way. Pursuing an easterly course we soon entered a good-sized lake, called, as nearly as I could make out, Minniquagaming, but which on my return, and with Dr. Bell's report before me, I find should be spelt Mani-gwa-ga-mi, or Pine Lake. It is upwards of ten miles in length, and from half a mile to two miles in breadth. The bearing of the longer axis is about N.N.E. Here Stephen White expected to find the family of the Indian who was to guide us to English River Post. We accordingly spent the remainder of the day in exploring the lake, and at the same time looking for this family. Our search was unsuccessful, and we finally camped on the west side of the lake some four miles north of where the river enters it.

I saw some tracts of good arable land on this lake, more particularly on the west side, a little north of the river. On going back here I was pleased to find a seemingly excellent tract of land. It is elevated above the lake at least forty feet, gently undulating, with a light clay loam soil, which looked to me capable of growing excellent wheat or anything else that the climate will bring to maturity. Fire had burnt off most of the timber, but some of the aspens that had escaped measured five feet in circumference. The

gravel on the beaches is largely composed of bits of fossiliferous limestone, and there is, no doubt, a good percentage of lime in the soil. I am favourably impressed with the fertility of the country in the vicinity of this lake.

The prevailing timber all round this lake is aspen, with a few patches here and there of spruce and tamarac. The ridges bounding the lake do not attain a greater elevation than 100 feet. Banks of clay and sand of forty or fifty feet in height were conspicuous at several points on both sides of the lake. The rock is for the most part Laurentian, and I did not observe minerals of any economic value. Indeed, there are comparatively few places where the rock is uncovered or exposed to view.

July 20th.—Barometer 28.9, and threatening rain. As, notwithstanding the smoke of our fire, and the firing-off of several shots, there was no appearance of the Indians of whom we were in search, we started about 8 a.m., Stephen White having agreed to go with us as far as another lake where he still entertained some slight hopes of finding the family. Crossing the lake we entered a channel on the east side, which soon opened out into another lake some three or four miles long and about half a mile wide, the longer axis bearing about N.E. and S.W. Our search on this lake was also fruitless; no Indians were there. White's explanation was that the family had probably gone off somewhere to gather birch-bark for repairing and building canoes, a supply of which is usually laid in at this season.

The soil, the timber, and the rock are the same as those found on the adjacent Manigwagami Lake. Leaving this lake, we proceeded on in a northerly and easterly direction down what at first seemed an arm of the lake, but which proved to be the Kenogami river, and in about two miles we came to the eighth portage. This is on the right, and only about eighty yards in length. The fall in the rapid is not more than three or four feet. A short distance below this rapid, on an easterly course, we enter Arm Lake, about four miles long in a north and south direction, and half a mile wide. This also, we searched in vain, and, not a little disappointed, landed for dinner on the east side nearly opposite where we had entered the lake. This place is a mile and a-half from the last portage, and not far from where the river again leaves the lake.

Here Stephen White was obliged to leave us and return to his post. Our only alternative was to return ourselves, or go on and trust to the guidance of the two young lads we had brought with us from Long Lake. My voyageurs did not seem to like the idea very much, having heard that there were many dangerous rapids to be run before we could reach English River Post. I was glad, however, to find that whatever misgivings they, in common with myself, might have had, no objection or complaint was made by any of them. At quarter to two o'clock, therefore, we once more resumed our journey northward, White returning to Long Lake in a small canoe which had been brought with us for that purpose.

A little over three miles in a N.E. and E.N.E. direction brought us to the ninth portage. This was preceded by several strong rapids which our youthful guides ran with such good judgment and skill as considerably increased our confidence and raised our spirits. This portage is on the right, about half a mile in length, with a fall, as estimated by me, of about fifteen feet. We camped at the lower end of this portage. The soil at the lower end of the portage is sandy, reposing, however, on clay. About half of the portage is over a muskeg.

July 21st.—Soon after we had started this morning we entered a lake now small, but which I would judge to have been at some former time much more extensive. What we see of the lake is not more than half a mile one way by quarter of a mile the other. Dr. Bell, however, found it to be two miles in length and to contain several small islands. It is the occurrence of these islands which probably prevented my seeing the full size and extent of the lake. It is called Kapeesa-wa-tan, and receives, according to Dr. Bell, a considerable stream from the south, called Manigwa-ga-mi-shish, or Little Pine river, so called from a lake of that name in which it has its source. The country here seems low and flat, the soil where seen is rather light and sandy, and timber small, and so continues most of the way to the next or tenth portage, some six miles from the last. Two miles below the lake above mentioned, the Kenogami receives a stream from the south called Wa-big-a-no or Mouse river, and on the same side, but a mile lower down, another smaller stream.

The tenth portage is on the right bank about 140 yards in length, with a fall in the rapid of twelve feet.

Starting again at 10.40 a.m., we pass two or three small islands, and in about three quarters of a mile come to the eleventh or Long Portage. Our course so far this morning, although variable, has been on the whole eastward. The rock, where exposed in this stretch, is still chiefly Laurentian gneiss.

The eleventh portage is on the right side, and about one and a half miles in length. The fall here, according to Dr. Bell's measurement is seventy-five feet. To my surprise, this rapid was run by Nolin, Sanson, and the two Indian boys in the canoe, which although light, was a rash and dangerous undertaking as it seemed to me, and one which I think they would hardly venture to attempt again. They got down, however, with nothing worse than a good wetting and some little damage to the canoe. The portage passes over a ridge covered with, if not composed of, drift sand, gravel and clay, abounding with pieces of fossiliferous limestone, one of those I noticed at the lower end, being at least twenty-five pounds in weight. It was half-past four before all our baggage and supplies were got over, and we were ready to resume our journey.

The land, though not first-class, is fairly fertile, and will afford excellent pasture.

The distance between the eleventh and twelfth portages is about two and a half miles, in which stretch there are several strong rapids and a number of islands. A brook falls in on the left side a little below the foot of the rapids at the eleventh portage, and another small stream about half a mile lower down on the same side. There is good land on both sides of the river in this stretch. The timber is chiefly aspen and spruce. The rock, where seen, is Laurentian, gneiss, syenite or granite. The twelfth portage is quite short, say twenty yards, with a fall of five feet in the rapids, which were run by the canoe with some of our things. The thirteenth portage is only a few chains below the last. The portage is situated on the right hand side, seventy-five yards in length, with a fall in the rapid of ten feet. The barometer, the height of which was 29.10 when we started this morning, stands at 29 here on this portage, some atmospheric change more than counteracting the difference due to the lower elevation, which would otherwise have occasioned a rise instead of a fall of one-tenth of an inch in the height of the barometer. Following the bends of the river, I roughly estimated the distance from Long Lake House to this portage at about forty-five miles. Our course since leaving the eleventh portage has averaged about N.E. We camped here for the night.

July 22nd.—This being Sunday, we remained in camp. Barometer this morning 29.2, and in the evening 29.3.

July 23rd.—Barometer 29.5.

Started at 5.40 a.m., and soon came to strong rapids which were safely run. Fair land below this rapid on the left. A little lower down, or three-quarters of a mile from camp, a brook enters on the left, with good land on both sides of the main river; river three to five chains in width; several small rapids and an island bring us to the fourteenth portage, distant about a mile and a half from the last; general bearing about north-east. This portage is on the right hand side, and about 275 yards in length. The fall in the rapids is fifteen feet. I noticed spruce trees on this portage from six to seven feet in circumference. Rock, syenite.

Crossing this portage we got under way again, and quarter of an hour thereafter, arrived at the next or fifteenth portage. The bearing of this stretch is also north-east. The land low and flat. Rock, syenite. The fall here is six feet. The portage is on the left and about 100 yards in length. Timber mostly a second growth, and small. In ten minutes after leaving this we were once more obliged to make a portage, the sixteenth from Long Lake. This is on the right hand side, about 600 yards in length, and descends twenty feet.

The soil on this stretch is light and sandy, and supports a young growth of banksian pine.

We started from the sixteenth portage at 9.58 a.m., and at 11.23 came to the seventeenth portage. The general bearing is still north-easterly. In the course of this stretch, which is four and a half miles in length, the character and appearance of the river, the country, and the rock, are all perceptibly changing. The river is becoming broader

and shallower. Perpendicular banks of greater or less height, and composed of drift clays, gravel and sand begin to appear on one side or the other. The drift is full of pieces of fossiliferous limestone, and the beaches strewn with the same. The banks referred to vary from ten feet to forty or fifty feet in height. We begin to meet with land slides, the first seen since we left Pic river. The Laurentian rock is more rarely met with, and then only on islands or in the low reefs crossing the river, altogether it becomes evident that we are now approaching the vast region lying south of James' Bay, which is underlaid by the flat-lying Silurian and Devonian rocks. The timber consists of spruce and tamarac on the swampy, and aspen on the dryer ground. The seventeenth portage is on the left side, and about seventy-five yards in length. The descent in the rapids is six feet. About half way between the sixteenth and seventeenth portages, a large tributary called the Atick, or Deer river, enters on the left or north-west side.

Leaving this portage we came in about quarter of a mile to the eighteenth and *last* portage on this river. It is on the right hand side. The length of the portage is only two chains, and the fall in the rapid is four feet. The rock here is a light-coloured gneiss.

From Long Lake House, which is situated at the northern extremity of Long Lake, to this portage is, following the bends of the river, by my own rough calculation, about fifty-four miles. The distance in a straight line from the first portage below Long Lake to this point is probably not more than forty miles. From this to Albany factory, some 240 or 250 miles, the navigation is said to be unimpeded by falls or impassable rapids.

We set out from this point just about noon—my crew not a little elated at the prospect of being relieved from the severe labour entailed on them by long and numerous portages. The course of the river, which has been north-east for some distance above the last portage, becomes now east north-east. About two miles below the last portage we stopped on the left hand or north-west side, and while dinner was cooking I went back to examine the land. The bank here, 40 feet in height, is composed of drift-clay, gravel and sand, without appearance of stratification, and encloses numerous pieces of limestone. On the top the country is level, and the land, as far as I went, seemingly good, bearing, as it does here, a fine, healthy growth of timber. I measured spruce that were six feet; birch and poplar, four and a half feet; balsam, four feet, and tamarac four feet in circumference. The soil seemed to be between a sandy and a clay loam. About eight miles below the portage we came to the confluence of a large stream from the south, called the Pe-wa-na-go, or Flint river. The land on both sides appears to be generally good. The timber consists chiefly of aspen, not very large, but seemingly healthy. I have no doubt that the country is underlaid by limestone and other stratified rocks, commencing a very short distance below the last or eighteenth portage, if not actually above it. Five miles below this portage we could plainly feel the flat rock with our poles in the bed of the river, and, although buried out of sight on the beaches, I was convinced from the numerous large angular pieces of limestone, shale and sandstone visible on the banks, that we had arrived at the outcrop of these beds several miles above that point, or even between the sixteenth and seventeenth portages. The Keno-gami river above Flint river is from four to five chains in width with a rather strong current, and frequent ripples or small rapids.

Below the Flint river islands become more numerous, and the river itself wider and shallower, being in some places as much as quarter of a mile nearly in width, and here the land appears to be low and wet, if not swampy. It is not improbable that this has been a shallow lake, now partially, but not completely drained. About two and a half or three miles below the junction of Flint river, another good-sized stream called Watesktekooma, falls in on the opposite or north side. This is, I presume, the river mentioned by Dr. Bell, and called "Watistiquum." Passing this, and continuing our downward course for seven or eight miles, we camped on the north side. This point is probably about twenty miles from the portage, and not far from the island called Pembina Island, in Dr. Bell's reports. I unfortunately lost most of the geological reports relating to this section of the country in the fire on board the steamer Manitoulin last year. This, together with my inability to procure an experienced guide, acquainted, not only with the river we have been descending, but the surrounding country, have been great drawbacks and prevented

my obtaining as full and complete information on many subjects and points as I could have wished. The land near the river for the greater part of the last stretch is low, presenting again to my mind the appearance of a recently (in a geological sense) drained lake. No doubt higher banks, rising to the general level of the plain, surround this lake basin, but these are not seen from the river, or at least only now and then. At our camping place these banks approach the river and are some thirty-five feet in height, rising at once nearly to the level of the plain above. I cannot better convey an idea of the character of the material composing these banks, and, as I believe, much of the soil of the adjoining country, than by describing it as the "unsorted" drift of the Glacial Epoch. It consists of clay, sand, gravel and stones of all the rocks I have met with to the north or north-east, and of many that I have not met with "*in situ*," but which have no doubt been transported from points still further north than I have yet been. These materials are not stratified or arranged with any regard, that I can perceive, to their size, shape, specific gravity, or chemical composition, but are mixed together promiscuously, and spread to a greater or less thickness over thousands of square miles of this territory. This great drift formation extends in a wide belt from the Atlantic to the Pacific Ocean. Indeed it is not confined to our North American continent, but is spread in a like manner, I believe, over the northern parts of Asia and Europe. It may differ in composition, according to the nature of the rocks (always lying to the north) which have furnished the material, but its character otherwise, when *undisturbed*, is very much the same, whether it be met with in Scotland, where it is commonly called "till," or in this territory, where it is exposed to view, if not on the surface, at all events in the banks of the rivers. I am well aware that the so-called "till" in Scotland is not a fertile soil, but this is owing to its mineral character or chemical composition, and generally, I think, to a deficiency of lime. In consequence, however, of the widespread distribution of limestone on James' and Hudson's Bay, to the north, there is no deficiency of lime in the drift soils found between our great lakes and James' Bay. On the contrary they generally abound with calcareous matter—many of the clays being, as I have frequently observed, really marls—containing twenty per cent. and upwards of lime. So far as the inorganic matter is concerned, I believe this drift contains all that is necessary to form a good soil. When clay greatly predominates, as it often does in this drift, it is too retentive of moisture, especially where the surface is flat and undrained. Hence it is that while we often meet with a strip of good land, carrying a healthy growth of aspen, spruce and birch, extending along the banks of the rivers and water-courses, which afford a certain degree of natural drainage, yet at a short distance farther back from the stream, without any change in the formation or soil, the land becomes wet, covered with a growth of bog-moss (*Sphagnum*), and finally with a greater or less depth of peat, or, in the language of the country, it becomes "a muskeg." I have frequently noticed that this "drift" when forming the banks of rivers or found, as it sometimes is, in ridges, is much less tenacious, or clayey so to speak, at or near the top of such banks or ridges than elsewhere. I am inclined to attribute this to the percolation of water (rain or melting snows), which in the course of time has removed a portion of the finer clay in the drift, leaving in such situations a larger proportion of sand, and converting the soil into a sandy loam.

July 24th.—Started at 5.50 a.m., and in the first hour passed several islands, one of which was, I have no doubt, Pembina Island, alluded to in Dr. Bell's Report. The timber is small, in consequence of fire having passed over the country not many years ago. A second growth of healthy young aspen is now springing up. The banks have become more regular, and are higher on both sides of the river. They have also changed their colour. This is owing to the appearance in the face of the banks of reddish, mottled, indurated marls, shales and calcareous sandstone, associated with the stratified limestones. I at once recognized these as almost identical with the rocks met with two years ago on the Albany river, a short distance above the Forks, or junction of this river and the Albany. At the end of three hours and a-half smart paddling, with a tolerable strong current, we reached the mouth of a large tributary on the right or south side, two and a-half or three chains in width. This is Bagutchewan, or Shallow-water river. It is said by my young guides to come from a very large lake of the same name. This may possibly be the Powgutchewan, which lies about eight miles N.E. of McKay's lake, the

source of Pic river. The variegated and mottled brownish and greenish marls, slates and sandstones continue to be the most striking geological feature presented in the banks of the river. The land near the river and its tributaries is generally good, but becomes wet, and finally ends in muskeg as we go back from the river. The general bearing of this stretch of the river, the length of which may be about fifteen miles, is between north-east and east-north-east.

Leaving the Bagutchewan, as Dr. Bell calls it, but which is Pa-yaw-koo-ge-wong in my notes, we came in about four miles to a little stream ten yards wide on the same side, where the red slaty marls and calcareous sandstones are exposed in the bank, and afforded me some good specimens. Leaving this at 2 p.m., we once more pursued our way down the river, which at this point is about six chains in width.

At the mouth of the little stream last mentioned, I went back to examine the land. I found the bank at that place nearly 100 feet in height. On arriving at the top, the plain, as usual, was quite level. The soil was a clay loam; and near the river where moderately dry, the timber was healthy and thriving. Not more than a quarter of a mile from the river, however, it had become completely covered with sphagnum moss, and, indeed, with a considerable depth of peat. This rapid falling off, or deterioration, is not due to any change in the soil, but simply want of drainage. The plateau is, as I have just stated, 100 feet nearly above the river, and does not fall away, but rather rises as we advance southwards from the river; but the soil is retentive and the country level, hence there is no natural drainage, unless it be on the immediate banks of the river. Four hours after we left this point, or at 6 p.m., we arrived at the Hudson's Bay Company's Post, known as English River Post. As we had the advantage of a pretty strong current in our favour, it is probable that we made from four to four and a-half miles an hour, and that the distance from Bagutchewan river to this point is, as estimated by Dr. Bell, about twenty-three miles by the river, or twenty-one miles in a straight line. The bearing of this stretch is north-east, or more accurately as determined by Dr. Bell, N. 50 E. From the brook where we took dinner, some four or five miles below the Bagutchewan river to near the H. B. Co.'s Post, the land adjacent to the banks of the Kenogami has every appearance of being suchas that last described. About four miles, however, above the Post, river bottoms of alluvial soil, and islands possessed of a like rich soil, were met with, and on these I observed fine healthy trees of black ash and elm. These elm trees are the first I have met with on this trip. About a mile above the Post the Kenogami receives a large tributary from the south called the Na-gau-gaming river, and another from the east called the White-water river just above the Company's Post. This is the place called Mamattawa in Dr. Bell's Report, and in reference to which he says, "Mamattawa is a contraction from an Indian word signifying 'the coming together of many branches,' and refers to the fact that two large tributaries here join the main stream from the east, and both of these again receive branches near their mouths. The Hudson's Bay Company had a post at this locality many years ago, but it is now re-established under the name of New Post, further down the river, at a distance of thirty miles from the Forks." Since the date of Dr. Bell's survey, however, in 1871, the Company has moved the Post back again to Mamattawan, and here we were kindly welcomed by Mr. Hunter, the officer in charge.

The following table of distances and of levels taken from Dr. Bell's Report may not be uninteresting or out of place here. Dr. Bell's barometric observations were conducted with two aneroid barometers, and compared with daily readings recorded, at his request, by Messrs. Ironside and Finlayson at Pic and Long Lake; and his calculations of distances, not only from long experience, but the use of the most perfect instruments, necessarily yield results more accurate and reliable than my own hurried and approximate estimate, and have generally been adopted in this report where the opportunity has been afforded.

PORTAGES ON ENGLISH (KENOGAMI) RIVER, COUNTING FROM LONG LAKE DOWNWARD.

No. of Portage.	Side of River.	Approximate length, in chains.	Fall in River, in feet.	REMARKS.
I.	Left.	14	20	Trail level and dry. Carry Canoes,
II.	Left.	5	7	Do. do. Wade light canoes.
III.	Left.	12	22	Banks of gravelly earth. Carry canoes.
IV.	Right.	9	25	Burnt land. Sandy trail. Wade light canoes.
V.	Left.	6	12	Run light canoes.
VI.	Left.	3	4	Do.
VII.	Right.	34	24	Steep bank at lower end. Carry canoes.
VIII.	Right.	4	3	Run light canoes.
IX.	Right.	2	10	Over rocks. Carry canoes.
X.	Left.	6	12	Lower end steep and rocky. Carry canoes.
XI.	Right.	120	75	Trail level, but intersected by a few small ravines. Steep bank near lower end. Soil yellow clay, overlaid by gravelly loam. Carry canoes.
XII.	Left.	1	7	Over rock. Carry canoes.
XIII.	Right.	5	10	Do. do.
XIV.	Right.	12	15	Level trail. Run light canoes.
XV.	Left.	5	6	Do. Carry canoes.
XVI.	Right.	25	20	Do. Wade full canoes.
XVII.	Left.	4	6	Do. Wade light canoes.
XVIII.	Right.	1	4	Run full canoes down. Wade up.

DISTANCE FROM LONG LAKE TO ENGLISH RIVER POST, OR MAMATTAWA, BY THE KENOGAMI OR ENGLISH RIVER.

From Long Lake to the 18th or last portage.....	70 miles.*
From the 18th or last portage to Pembina Island.....	21 "
From Bembina Island to the mouth of the Bagutchewan River....	16 "
From Bagutchewan River to Mamattawa or English River Post..	23 "

130 miles.

LEVELS ABOVE THE SEA.

Lake Superior.....	600 feet.
Long Lake.....	1066 "
Pine Lake, on Kenogami River.....	944 "
Pembina Island, do.....	480 "
Mamattawa, English River Post.....	400 "

* I think that there is some error in this distance, for my own estimate is only fifty-four miles. Nor does seventy miles agree with the particulars or details of the lengths of the different stretches as given by Dr. Bell. My impression is that Dr. Bell's estimate of seventy miles includes the second stretch of twenty-one miles, or from eighteenth portage to Pembina Island.—E. B. B.

July 25.—This is a small Post in the Albany District. Its chief use is that of a dépôt whereat the Indians may be able to obtain in winter such few absolutely indispensable articles as they may require, and of which they may have run short. With the exception of some half-dozen families, the hunters go to Albany Factory as soon as the rivers open in the spring to trade their furs and procure another outfit as it is called. The supplies for this Post are sent up from Albany in boats, which carry from three to five tons each.

The establishment consists of two small but substantial dwelling houses, a store or trading-shop, and root-house. They are separated from each other by a space sufficient to prevent the spread of fire. The danger of fires, particularly bush fires, seems never to be forgotten or overlooked by the Hudson's Bay Company's officers in locating their Posts. In order to secure themselves and the Company's property against destruction, islands or peninsulas are very often selected whereon to establish their Posts. Soil is a consideration of less importance than security from bush fires. Another danger to be guarded against is that arising from high floods, more especially the spring freshets, when, owing to the rapid thawing of the snow which has accumulated during the long winter, the rivers are taxed to their fullest capacity, to carry off the sudden and enormous influx of water, from the vast areas which many of them drain. The country drained by the Kenogami and its numerous tributaries above this Post, cannot be less than five thousand square miles. This Post is situated on a peninsula formed by the Kenogami river on one side and White-water river, which falls into the Kenogami above the Post. The houses are some twenty-five or thirty feet, at least, above the summer level of the water in the river. On the top of this bank the land is level and of excellent quality. The soil is a sandy loam, rich in calcareous matter, and of alluvial origin. The only crop grown, or attempted to be grown, is the potato. These look remarkably well, although the season has been a backward and generally an unfavourable one. There is a striking contrast between the appearance of the crop here and that presented by the potatoes at Long Lake House, to the advantage of English River Post, making the largest allowance for the difference of dates when planted. Mr. Hunter says that the return is usually from fourteen to eighteen bushels from each bushel planted, and that he has never known it less than ten. No manure is applied, for no cattle are kept at this Post. He says that both soil and climate are better than at Moose Factory, where he lived for a number of years. He further says, that he never saw finer potatoes anywhere in respect of quality than those grown here.

When walking around the clearing, I was surprised to see a humming-bird hovering over some of the wild flowers. I did not think this pretty little stranger from the south extended its migrations so far north, or into such, in many parts, an uninviting territory; but I could not be mistaken, for it came a second time within a few feet of where I stood.

The young lads who have been our guides will set out on their return to Long Lake in the morning, and as there may be chances of forwarding letters, etc., from thence to Pic River Post, on Lake Superior, much of the day has been spent in packing and arranging specimens, a box of which I propose sending, and in writing letters to be taken by them as far as Long Lake House. These Indians have done much better than I expected, displaying, for their age, a remarkably good knowledge of the route. It may take them eight days to return, and they will be supplied with provisions to last that time.

July 26th.—Barometer 29.6.

The Nagaugaming branch of the Kenogami river, which falls in about a mile above this Post, is a fine stream, which, according to the Indians, has its source on the Height of Land in a lake lying to the south of this and north of Michipicoton River Post. Anxious to see something of the country in that direction, I engaged the chief, a man pretty well advanced in years, to be our guide, and leaving such things as were not likely to be needed in charge of Mr. Hunter, commenced the ascent of the river soon after ten o'clock. Half-an-hour's paddling against a strong current brought us to the junction. The alluvial soil is undoubtedly rich on the river bottom, supporting, as it does, a fine growth of elm, black ash, poplar and aspen, with some spruce and balsam. The willow grows very luxuriantly on the banks. Passing the junction, we left the Kenogami on our right. Our progress up the Nagaugaming, though impeded by no violent rapids or falls requiring

portages to be made, was very slow, owing to the strength of the current, and the impossibility of using the tow-line. We had not made more than seven or eight miles, I think, when we had to camp for the night. The land on the banks of the river is generally good, but in many places liable to be flooded in the spring, when, according to the old chief, the water rises from fifteen to twenty feet above its present height.

Limestone is very plentiful in loose pieces, but has not yet been noticed "*in situ*." Marine shells were found four miles above the forks, or five miles above the Post.

July 27th.—Barometer 29.5.

This river is about three chains in width. The banks in the rear of last night's camp rise to a height of thirty feet, and there is a fine, healthy growth of aspen for nearly half-a-mile in depth. It then deteriorates rapidly, and I soon came to the usual muskeg, with poor spruce and tamarac, not more than six inches in diameter. The peat was nearly three feet in thickness where I turned. Underlying the peat was a light grey or bluish clay.

The shallowness of the water and strength of the current again rendered our progress very slow. So much so that we did not make more than about eleven miles to-day.

The better land is confined to a narrow strip near the river. Some fair sized elm and ash are still seen, but not so fine as at or near the junction below. The sub-soil, as seen in the banks of the river, is clay, sometimes covered with a greater or less depth of sandy loam. Land slides are not unfrequent. The flat-lying rocks were met with about mid-day, and were frequently visible in the bottom of the river. Soon after dinner we came to the junction of a river called the Na-so-ha-ya, which is nearly forty yards wide. It joins the Nagaugaming on the right hand or western side. The latter stream, although as wide as before, is much shallower above this junction.

July 28th.—Barometer 29.4.

Soon after starting this morning, we came to a tributary on the left, about twenty yards in width. It is called the "Missigal." The great falling off in the quantity of water, accompanied by a great increase in the width of the Nagaugaming above this point, being not less in some places than eight chains, has rendered the river so shallow, that we continued our ascent with great difficulty until about 4 p.m., when it became necessary either to make portages or return. Satisfied that, in the present stage of the water, it would be impossible to ascend much farther in our large canoe, I concluded to return. The point thus attained, roughly estimated, is about twenty-eight miles above the junction of this river with the Kenogami. Our upward course has been, on the whole, southerly, or more properly S.S.W.

In the last stretch of the river the banks rarely rise to a greater height than thirty feet, and occasionally the land appears low and swampy. I have no doubt, however, that the general level of the country is thirty or forty feet at least above the bed of the river. The sub-soil, as usual, is a clay-marl, which sometimes approaches to and forms part of the surface, at others, is covered with a greater or less depth of sand, sandy loam or peat. Much of the sand and sandy loam, as well as gravel, seen above the clay in the banks of the river, has, in my opinion, been brought down and left there by the river itself during floods, and when its bed was more nearly on a level with that of the country than now. I am led to this belief by the circumstance that these superficial deposits of sand and gravel rarely extend far from the immediate banks of the rivers, and that the muskegs or peat mosses so generally met with on penetrating inland, seem invariably to repose on clay. While a strip of good and well timbered land extends, as usual, along both sides of the river as far up as we ascended, in no instance, where examined, did it extend more than half a mile back from the river. The flat-lying limestone rocks reach further than the highest point attained by us. Beds of limestone, calcareous sandstone, and variegated clay marls, similar to those on the Kenogami river above the junction of this river, and also to those on the Albany river, above the junction of that river and the Kenogami, were met with in several places to-day. I was disappointed that we were unable to ascend the river to the outcrop of these stratified rocks, and the commencement of the Huronian and Laurentian rocks by which they are bounded on the south.

We now returned to, and again encamped on the same ground which we had occupied last night.

July 29th.—This is Sunday, but being somewhat short of provisions, and anxious to push on, we dropped quietly down the stream and reached the Hudson's Bay Company's Post in the evening. Range of barometer to-day from 29.5 to 29.6.

July 30th.—I now concluded to ascend the White Water river, which comes from the eastward and enters the Kenogami or English river at this post.

I did not, however, owing to the shallowness of the water, expect to be able to go very far. Mr. Hunter was kind enough, not only to furnish me with a small canoe, but to accompany me himself. The White Water river is so called, in consequence of the colour of the water. Almost all the rivers on this, as on the other side the Height of Land, are more or less dark-coloured. This river and the Abittibi are among the exceptions, the water being muddy and light-coloured, owing to the presence of fine clay. It is about two chains in width. We had barely ascended two miles on a general course of E.N.E., when we arrived at where the river divides or forks. The stream on the left is called the Ship-pa.gach-tik, or Go-through river, that on the right retains the name of White Water river. We first of all ascended the Ship-pa-gach-tik, which is here about one and a-half chains wide. There is a route to Albany Factory from English River Post, which follows up this river, and passing through several lakes, strikes the Albany river a considerable distance below the junction or forks of the Kenogami and Albany rivers. It is shorter, I believe than the route *via* the Kenogami, but I suspect only practicable for small canoes. It offers advantages probably on the upward journey from Albany Factory to English River Post, as avoiding, to some extent, the strong currents of the Albany and English rivers. We only ascended this branch about two miles when we returned to the junction to continue our way up the White Water river. About four miles above this junction a small stream called Squirrel Creek joins on the left. This, too, we ascended for a short distance until we came to a small rapid whereat there was a fish-trap. These traps are very simple and probably of very ancient origin, and although illegal, their use should not be forbidden a people so hardly pressed to obtain food as the natives of this territory. It belonged to a widow whose husband had died and left her with four or five young children to support, a sad and sufficiently difficult task for a woman anywhere, but a terribly hopeless one (as it appears to me) in a country like this. It contained a goodly number of fish, known in the country as the grey sucker, red sucker, pickerel and bonzee, the latter resembling the sucker, but with larger scales, a deeper body, and red fins and tail. Returning to White Water river, we followed it up for about an hour, when finding that we could make little headway owing to the strength of the current, we gave it up and returned to the Post.

As might be expected, the land is better and in larger quantity around this post than in most other parts of the territory. I have over and over again called attention to the fact, that the comparatively small extent of arable land met with in this lower belt, is due to the flatness of the country and imperfect natural drainage. But, at this point, where so many large rivers unite, each of which acts as a drain to a limited distance on both sides, it is not difficult to understand that the land, much of which is alluvial, should be good.

The White Water river takes its rise, the Indians say, in a lake called Oban, a short distance only from Dog Lake, which is the source of Michipicoten river. It can be descended without difficulty in the spring and early summer, but it is very hard to ascend it, owing to the strength and rapidity of the current.

FROM ENGLISH RIVER POST TO THE FORKS OF THE ALBANY.

July 31st.—Barometer 29.7.

Having determined on following the Kenogami to its junction with the Albany river, and arranged with two Indians to accompany us as guides, we bade Mr. Hunter and the few people at this isolated post farewell, and started.

This is a fine deep navigable river, and although we stopped repeatedly to make short excursions back to examine the land and the soil, we had made about forty miles, when

we camped for the night. The river is very uniform in width, seemingly five or six chains. The course or bearing, too, is very straight, rarely deviating much from a north-easterly direction. In the whole distance of forty miles, it changes its course only forty times, giving a mile on an average for each stretch. On Pic river I was obliged to take as many observations or bearings in eight miles, and these, too, running oftentimes more than half round the compass; whereas the Kenogami makes no quick turns, each stretch being generally only a few degrees east or west of that which preceded it. The current, too, at this season of the year is very moderate as compared with Moose, Albany, Abitibi, or indeed any other river I have seen north of the Height of Land.

As regards the nature of the country through which this fine stream flows, I cannot convey a better idea than by simply quoting from the notes made from time to time as we went along, the numbers referring to the stretches. These, as already mentioned, amounted to forty in the course of the day, and as the distance travelled was about forty miles, we may, for convenience, consider each as representing a mile, our starting point being Mamattawa or English River Post.

1st and 2nd Stretches.—The land is such as I have already described that situated near the H. B. Co's Post to be.

3rd Stretch.—The banks are low, and muskeg is not far from the river at this point. The river itself is a fine stream five to six chains in width, deep, with a quiet, calm surface and moderate current. Although many feet lower, than in the spring or early summer, it has the appearance of being full to the brim. This arises from the circumstance that willows grow to the very edge almost of the water. First of all there is a narrow, low beach, then a sloping bank, rising to a height of from six to ten feet above the water, and covered with a luxuriant growth of grass and willows, and then a thick growth of spruce of inferior quality and size. This is all that can be seen from the river. But it is more than probable that this swamp, for it is properly such, is bounded at no great distance by another and higher bank, which rises to the general level of the vast plain through which the river flows.

6th Stretch.—Banks higher. Timber mixed and more healthy, indicating drier and better land.

9th Stretch.—A stream about fifteen yards in width falls in on the west side. A fine point of rather low land on the right; mixed timber, including some elm and black ash.

10th Stretch.—Land rather low, especially on the west side. Timber small, being a second growth of some twenty years' standing. On landing and going back, I was surprised to find that the bank rose twenty-five feet above the river, that the soil was a good sandy loam, dry, and free from bog-moss as far as I went.

11th Stretch.—Soon after we had resumed our journey, a stream about a chain wide discharges on the same, west side. This, and the main river, afford the land just referred to good natural drainage; the soil, too, is a sandy loam, instead of the clay so nearly universal. These circumstances, together with the comparatively recent fire, fully account for the absence here of the too prevalent sphagnum moss and peat. Some distance below the point last referred to, the muskeg seems to come right up to the bank of the river on the west side and apparently also on the other side.

16th Stretch.—Went back on the east side. A swamp full of dead, fallen and rotting timber, but slightly higher than the river. A couple of hundred yards back we thrust down a pole to find what depth there might be of peat or muck, and the character of the sub-soil. The pole could not be driven down more than two feet when it came to a hard bottom, but still neither sand nor clay could be observed on the point of the pole. At length John Sanson, rolling up his sleeves and making a hole, found it was ice. At another more open spot, we got the pole down three feet, and found that the sub-soil was clay. Immediately on the bank of the river the soil is sandy. As we descend, the beaches are becoming wider and less overgrown with willows, which are probably kept down by the rush of ice in the spring.

17th.—Tried the depth of the river, and found it to be eight feet, about the middle.

23rd Stretch.—Took dinner here, on the west side, and went back while it was cooking. The bank is nearly twenty feet in height, but the land became lower as we

advanced. In a quarter of a mile we came to a swampy pond, which prevented our further advance in that direction. The soil, however, was pretty good, some spruce trees near the pond measuring from seven to eight feet in circumference, and high in proportion. Poplar, too, of large size had grown here, but were now dead and rotting on the ground. The floods must rise, or at least have risen, to a great height, for there are marks on the trees near the river, made by ice, at least twenty feet above the present level of the water. When thus flooded, many hundreds of square miles of low lying and swampy land on this river must have been submerged. General course N.N.E. The river continues wide and without violent rapids. The land appears lower on both sides for some distance, and the timber inferior.

25th Stretch.—The land becomes higher and drier, with a growth of fine, healthy aspen on the west side.

26th Stretch.—I went back on the west side and found large, healthy timber and fine land, which extends several miles, and it is equally good, in all probability on the east side.

28th Stretch.—Land lower, and timber apparently not so good, consisting almost entirely of spruce and tamarac.

30th Stretch.—Rock seemingly sandstone *in situ* on the east side; took specimens, but the bed is so near the water's edge and upon the same level, that it was impossible to get the dip or ascertain its thickness. Land apparently low and swampy on both sides. Went ashore on the east side some distance below the exposure of rock just mentioned. Intended to go back and examine. Ascended the bank and saw it was swampy, but was assailed by such a swarm of mosquitoes from a lately abandoned camp on the beach that we were compelled to beat a retreat and embark as quickly as possible. It would seem as if they had been attracted by the offal of fish and other garbage lying around the camp, in prodigious numbers from the adjacent swamp.

32nd Stretch.—A few years ago the Hudson Company's English River Post was here on the east side of the river. It was situated on a moderately high bank, barely high enough, however, to be safe from exceptionally heavy floods. Ice-jams do not occur, Mr. Hunter says, on this river. There was on the opposite or west side a clearing which had been cultivated. I stopped to examine it. It is called in the language of the country "A Garden," but potatoes were most likely the only crop grown. It is situated on a plateau thirty feet above the river. The soil is a good sandy loam of which I took a sample. Mr. Hunter told me that excellent crops of potatoes were grown here. There seems to be a large quantity of land of the same description and quality lying on the banks of this river. The river below this takes a westerly bend, and on the east side the bare sloping bank is full of limestone gravel and twenty-five feet in height. It is covered on the top with a dense second growth of aspen. A mile below this again the land is low and swampy on the west, with a bare dry gravelly point on the east. No strong clays have been seen for some time.

37th and 38th Stretches.—Spruce timber on both sides. Land low and swampy, or running into muskeg, as far as can be judged from the canoe, and so continues to the 40th stretch, at the end of which we encamped for the night. Barometer 29.7.

August 1st.—Barometer 29.6.

Once more resuming our journey, the 41st Stretch is nearly due north, and a small stream or brook ten yards wide falls in on the right. On the east side, the land is low and covered with a growth of spruce and tamarac. On the west it is higher, and the timber aspen and birch, with a few tamarac.

42nd and 43rd Stretches.—The higher and drier ground, and therefore the aspen and birch, etc., are now on the right or eastern side, and the lower and wetter ground, or, in other words, swamp, with its appropriate growth of spruce and tamarac, is on the left or western side.

44th Stretch.—The banks on both sides are now higher and show a great deal of aspen.

45th Stretch.—A good-sized stream enters this, the Kenogami river, on the west side. Elm trees, or what seem to be such at a little distance, cover an island at the mouth of this stream. It is called Nes-taw-pow-tick by my guides.

46th Stretch.—For some distance the land has been higher, drier and apparently better on the west side. It is now best on the east side, and we stopped in order that I might go back and examine it. The bank at this point rose to a height of 35 feet above the present water level of the river. It was composed of shelly clay and sand, the latter as usual on top.

The timber consisted of aspen, poplar, birch and spruce of medium size. The country is level, as usual, and soil of fairly good quality. Half a mile back from the river, however, this is all changed. Bog-moss (*sphagnum*) had taken possession of the soil, the aspen, poplar and birch had given place to spruce and tamarac entirely, and these even had dwindled in size and become scrubby and worthless. Here the bog-moss and peat were found to be four feet in thickness, and immediately below we found clay as usual. Now, the question is: What has become of the sand which, as seen in the banks of the river, overlies the clay to the depth of many feet? The only rational explanation of this that suggests itself to my mind is, that this sand is generally an alluvial deposit only, brought down and left there by the water of the river during the spring freshets; the depth of this sand or sandy loam being greatest on the immediate banks, and thinning out as we go back, until at a comparatively short distance the clay sub-soil (as seen in the bank) comes to the surface, and we have at once, as the result, wet land, bog-moss and peat.

50th Stretch.—The country continues low and flat, the land for the most part such as last described. We now come to a large tributary on the west side called by our guide Kajee-ja-a-sheesh, which rises he says near Long Lake. It is three chains in width, and is probably the river alluded to by Dr. Bell, as draining several of the lakes lying north-west of Long Lake, and called Ka-wa-kash-ka-ga-ma. It may be, that I have failed to catch the name correctly, which is not unlikely, or that there may be different names given to the same river by the Indians on the Height of Land who are Ojibbewas, and those of the lower Albany and Kenogami, many of whom are Crees.

52nd Stretch.—The land continues low and wet. Sounded the depth of the river and found it upwards of ten feet in the middle.

53rd Stretch.—Went back on the east side where the bank was hardly twenty-five feet in height. Found near the top of the bank poplar, spruce, birch and aspen of good size. As we advanced we came where the bog-moss began to cover the ground very soon, but it increased very slowly in thickness. Still the timber fell off in size and healthiness as we went on until at the end of half a mile the trees were reduced to little more than half the size they were near the bank, though some were still about twelve inches in diameter. There were a good many trees of large size lying on the ground and rotting. I saw no signs of any recent fire. My impression is, that where the land is annually or even less frequently inundated or overflowed with the water of the river, which deposits more or less sediment; the sphagnum moss does not thrive, and peat, if it accumulates at all, does so very slowly. There may be swamps or marshes, but rarely, if ever, peat mosses.

56th Stretch.—Land seemingly good on the right, but low and poor-looking on the left. Course northerly.

57th Stretch.—An island, and the river very wide, forming a deep bay on the west side. Land apparently pretty good.

59th Stretch.—Stop to examine the west side. Bank nearly twenty feet in height, with mixed timber of fair size. In quarter of a mile from the river, we came to swamp, crossing which the surface rises, and we soon came to muskeg, with peat three feet in thickness reposing on clay. In the next five stretches there was nothing in the appearance of the country to call for remark.

65th Stretch.—This brought us to one of the sites of Henly House, a trading post of the Hudson's Bay Company, which, like English River Post, has been shifted several times. Here it was on the left bank. The clearing is still to be seen. The soil appears to have been tolerably good. A quarter of a mile now brought us to the junction of the Kenogami and the Albany rivers. The river in its last stretches has been at least twenty chains wide, and looks like a placid lake, as it did to me two years ago when I passed this junction and looked up this self-same stretch as I was ascending the Albany to Martin's Falls and Osnaburgh. The barometer at the Forks, or junction, stood at 29.625

The fall or descent in the river from Mamattawa, or English River Post, to the Forks is very moderate. Dr. Bell's estimate of the distance is fifty miles in a straight line, and sixty miles by the river. In all this distance there is not a hill, a ridge, or even a knoll, as much as one hundred feet in height that can be seen from the river. The banks are generally from ten to thirty feet, and the elevation of the great plains, largely covered with peat-mosses, lying on both sides the river, probably ranges from thirty to fifty feet above low water mark. There are consequently very few points where rock is seen in place. Indeed, I only observed it in two stretches, and there it barely rose above the present level of the water. That the rocks underlying the whole of this section of the country belong to the Silurian and Devonian formations admits, I think, of no reasonable doubt. Buried as they are, however, under the drift clays, there is no way of ascertaining the nature, thickness or order of succession in which the strata occur. I observed "marine shells" in a bluish grey clay on the Naugaugaming river, about four miles above its junction with the Kenogami, and at one or two other points in the banks of this latter between Mamattawa and its junction with the Albany river. Some of these collected by Dr. Bell are named by him as follows: 1. *Saxicava ragusa*; 2. *Myatruncata*; 3. *Tellina proxima*; 4. *Cardium Greenlandicum*; 5. *Leda truncata*; 6. *Mytilus edulis*; 7. *Tellina Greenlandica*; 8. *Buccinum undatum*.

Some of the fossils found by Dr. Bell on this river above the Mamattawa, near Pembina Island, were submitted to Mr. Billings, and recognized by him as belonging to the following:—Four corals, viz., *Favosites Gothlandica*, *Halyssites catenulatus*, *Syringopora* and *Zaphrentis*; two Branchiopods, *Strophomena* and a *Rhynchonella*, together with a Trilobite belonging to the Genus *Encrinurus*. He (Mr. Billings) says, "I consider these fossils to be Upper Silurian, about the age of the Niagara formation." The commonest fossils, according to Dr. Bell, are, 1. Small Orthoceratites; 2. a large chambered shell-like *Nautilus*, and one like *Holopea*, but Mr. Billings did not think these fossils could determine the age of the formation.

This stretch of the Kenogami, or English river, is altogether the finest reach of navigable water I have seen on any river north of the Height of Land. Even at this season a steamer drawing three or four feet of water could pass over it with perfect ease and safety. Above English River Post the river runs more rapidly and in the ripples or streams, and in some of the very wide places, probably two feet is as much water as could be depended upon at this season. In spring of the year, however, the water rises from ten to fifteen feet above its summer level, and I have no doubt whatever that steamers of large size could then ply between the eighteenth portage and the junction of the Kenogami with the Albany, a distance of 120 miles.

FROM THE FORKS, OR JUNCTION OF THE KENOOGAMI AND ALBANY RIVERS, TO ALBANY FACTORY.

As it was my intention, after visiting Moose Factory, to return by the Missinaibi river as far as New Brunswick, and from thence to explore the country in the direction of Long Lake, and as I had (in 1881) examined and reported on the general features of the country passed through on the route from this point to Albany Factory and from thence to Moose Factory, I propose hurrying over this part of our journey as quickly as possible, and the observations I may be able to make will be few and short.

It was nearly three o'clock in the afternoon when we left the Forks and took our way down the Albany, which here is of considerably more than average width, with a number of islands. The water, however, at this season of the year, is not nearly so deep as it is in the Kenogami, and on that account, although the current is very much stronger, and frequently rough, yet our progress is slower, owing to the caution necessary to guard our canoe against serious injury from the sharp rocks in the bottom. Some twelve miles or so from the Forks, and a short distance below the site of Old Henly Post, we camped for the night.

August 2nd.—Barometer 29.7.

Our camp was on a point on the south side of the river, which is probably submerged at the period of the spring freshet. The soil is alluvial, of good quality, and here some large spruce and poplar, which had escaped the almost universal conflagration in 1881, were found growing. It was a raw, wet morning, and about 8 a.m. before we started.

The course of the river varies between N.E. and E.N.E. In width it is from quarter of a mile to one-third of a mile. Current strong, with frequent short rapids, sometimes occasioned by the out-crop of the flat rocks underlying the bed of the river, and at others by reefs of stones or boulders extending across the river. The noise occasioned by the flow of the water over and between the stones forming the natural weirs or dams, is often heard at a considerable distance, and leads the voyager to expect a much greater fall, and rougher water, than he finds when he reaches them. The descent is not more than from a foot to eighteen inches. In its passage over the irregular masses of limestone the water is in many places thrown up six or eight inches above the ordinary level or surface, often producing, when viewed from a distance, a peculiar "dancing" appearance, especially if the atmosphere be in that state which gives rise to what is called "mirage," as is frequently the case on these large rivers. I have been repeatedly deceived by this appearance, taking it for wild-fowl flapping their wings, or flying above the water. The water is shallow, but not so low as when I ascended the river two years ago. It was then lower than had been known for many years, in consequence of the long continued drought, and bush fires were raging at short intervals all the way from Albany Factory to Martin's Falls, a distance of over 200 miles. The country is flat, and the height above the summer level of the river seemingly forty or fifty feet. We occasionally passed points of good alluvial land, and along the higher banks there is the usual strip of drier and better land, bounded at no great distance by peat mosses. The timber, with the exception of small spots at considerable intervals, has been destroyed by fire. Several brooks and streams have been passed in the course of the day, the most considerable being the "Chemahawgan," on the right or south side. This stream is at present only twenty-five or thirty yards in width, but the size of its bed shows that it must be a large river in the spring. This and the other streams passed since we left the Forks have their sources in lakes, lying at various distances on each side the Albany, but more particularly on the south side. These lakes, although sometimes of considerable extent superficially, are, I believe, shallow. They owe their existence, as I conceive, chiefly to the erosion and washing away of the drift clay by the action of the rivers which now flow from or through them; or in some instances, to the fact of their having formed the beds of larger rivers at some time or other, but which larger rivers have now changed their courses—changes of which there are not wanting many indications, especially as we approach nearer to the coast of James' Bay. The flat rocks form the bottom of the river in many places, but are not seen in the banks. The beaches are covered with pieces of fossiliferous limestone of all sizes, some of them so large and angular as to render it exceedingly improbable that they are erratic, or have been removed more than a few yards from the parent rock. But associated as they are on the beach with boulders of granite-gneiss, porphyry, trap, basalt and quartzite, which we know must have been transported in all probability from the East-main coast, there is an element of uncertainty attached to these pieces of limestone, which greatly diminishes the interest that would be otherwise felt in the fossils they contain.

A little above the Chemahawgan the bank on the north side is about forty feet in height, and here a recent land-slide had exposed a stratum of clay, containing marine shells, one species of which, the common "muscle," is found living almost everywhere at the present day on the shores of James' Bay. Another bears a very strong resemblance to a shell-fish called the "cockle," very common in the north of England. I have met with great numbers of these shells on the coast of James' Bay, but none actually alive, although I am persuaded from their appearance that they must be found further north in James' or Hudson's Bay than I have been. The existence of marine shells of living species, between three and four hundred feet above the present level of James' Bay, is an interesting fact, indicating, as it does, the submergence of the greater part of this territory at a comparatively recent (geological period). These shells are too fragile to have been transported or brought any great distance, and lived and died, in my opinion, on the

spot, or almost on the spot, where they are now found. There is evidence to be seen everywhere on the coast of the fact that the water is either subsiding or that the land is rising.

We camped for the night a little below the Chemahawgan.

August 3rd.—Barometer 29.8.

About eight miles or so below our camping ground of last night we came to Chepy river, which also falls in on the south side and drains several large lakes, some of them, according to information given me by an Indian (in 1881), being probably not less than fifteen to twenty miles in length. This river must discharge a great body of water into the Albany when the spring freshet is at its height. It is 150 yards wide at the mouth, but contracts, as we ascend, to about forty yards. I went back on both sides, but soon came to muskegs. At one-third of a mile the peat and sphagnum-moss were five feet in thickness, and underneath the peat we found clay as usual. Taking samples of these, we resumed our journey. The main river at this point is very shallow and marshy, and nearly half-a-mile in width. Islands are now more frequently met with. The course has been north-east for some time. Pursuing our way for a number of miles through a badly burnt country, we came to and passed a large island called Cease-in-agá, camping on another still larger one lower down called "Bare-bone." Here we found the only standing timber seen for some hours.

August 4th.—Barometer 29.8.

Before leaving camp this morning I took samples of the soil and measured some of the larger trees. The spruce were six feet six inches in circumference; aspen, thirty inches to fifty inches; balsam and birch, about thirty-six inches in circumference. The ground was covered with the fruit of a species of blackberry, here called the eye-berry, one berry only in general growing on each plant, the height of which is rarely more than six inches. With the exception of a low point, here and there, the country adjacent to the river has been all overrun with fire and the timber either killed or entirely consumed. Following, however, partly as a result of these fires, we find abundance of wild roses, and other flowers, blue, white, pink and yellow, covering the ground in many places. About four o'clock in the afternoon we came to a stream on the left or north side called Fishing Creek, said to be about fifty miles from Albany Factory. Here there is one of the fish-traps before mentioned, and several Indian families were camped on the beach. We stopped, as is the custom, to shake hands, and presented each of them with a small plug of tobacco, which was all, indeed, we had to give. We had not started very long, however, when on looking back we noticed that the whole lot of Indians, numbering some six or seven canoes, had hurriedly struck their camps and were following us up, evidently resolved to camp alongside of us when we stopped for the night. As we were not at all anxious that they should, we pushed on at a rapid rate until it was getting dusk, and we were in danger of damaging our canoe if we proceeded further. Our pursuers had been left out of sight, but it was in vain; we had barely got our fire lighted and tents up when they arrived and, as I expected they would, camped on the beach close by. What they expected, I have no doubt, was a good supper and possibly other presents, for the Indians on this river are among the poorest I have met with. If this was really their object, they were doomed to be disappointed, and took their departure in anything but a good humour, as I thought, before dawn of day.

The only point at which I went back to-day, was on the north side, where there happened to be a nice little belt of fair-sized and healthy aspen, birch and spruce trees on the bank. The two former very soon gave place to spruce, which became smaller and more unhealthy as the sphagnum and peat increased in thickness, until, at the end of three-quarters of a mile, nothing but a scattered growth of dwarfed and unhealthy spruce and tamarac remained. At this point the peat was seven feet in thickness, and, as usual, reposed on clay. A very small delicate variety of cranberry is almost always found growing on these peat-mosses. They are of excellent quality, but scattered thinly over the surface as compared with the larger variety found on the marshes of Georgian Bay and Lake Nipissing. I found a few of last year's berries which were still quite good, though somewhat shrivelled. Our course has ranged from east to east north-east.

August 5th.—This being Sunday, we remained encamped.

August 6th—As we wished to reach Albany Factory to-day, all hands were called at 3.30 a.m., and we were in the canoe and ready to start at 4 a.m. Course N.E. to E.N.E. Barometer nearly 30.00. We soon entered on a still or slack-water reach, where the width of the river was about one-third of a mile. Country flat and mostly burnt. I have found, however, in several instances, that these bush fires are often confined to the drier ground and larger timber lying along the banks of the river, and did not extend far back into muskegs or peat-mosses which have evidently been too wet to burn.

About 8 a.m. (having spent one hour over breakfast), we arrived at the head of a group of islands which extends unbroken from this to the Hudson's Bay Company's Post, a distance of twenty miles. At 8.15 a good sized stream falls in on the right. Course, N.E., and current now strong with frequent rapids. Islands generally low, and liable to be flooded to a greater or less depth on the breaking up of the ice in the spring. Limestone is seen here in place, and several specimens were taken. A compact, dark-coloured indurated clay underlies the alluvial gravel and sand, which appear to be diminishing in thickness. This clay is highly calcareous. Timber, poor spruce and sometimes poplar. Channels among the islands somewhat intricate. At two p.m. we arrived at Albany Factory, and were hospitably received and entertained by Mr. Broughton, the officer in charge of this district. The distance from the junction of the Kenogami to Albany Factory is about 130 miles, and from thence to English River Post sixty miles, or 190 miles in all from English River Post (Mamattawa) to Albany Factory.

The number of inhabitants permanently residing here summer and winter is probably not more than fifty or sixty, as during the winter every one able to hunt, and not required at the post, is away. In the summer, however, particularly the earlier part, there must be at least four or five hundred, as the Indians scattered over a very extensive district, resort to this post with their furs. A very large proportion of both the native and white population were suffering at the time of our arrival from what seemed to me hooping-cough, and a considerable number of deaths had already occurred. I was afraid that some of my party might be laid up with it, but fortunately all escaped.

The Albany, from the Factory to the junction of the Kenogami, is a very large river, but too shallow to admit of steam navigation at this season of the year. It is, beyond all doubt, however, navigable by passenger steamers of light draft for sometime after the ice leaves, not only to the Forks, but to 18th portage on the Kenogami river.

August 7th.—Barometer 30.

Having stayed a day and a half at this post, and been kindly provided by Mr. Broughton with a fresh supply of flour and pork, to which he added, at my special request, twenty salt geese, we now only want a competent guide to Moose Factory to be able to resume our journey.

FROM ALBANY FACTORY TO MOOSE FACTORY.

August 8th.—Barometer 29.9.

Owing to the prevalence of sickness, Mr. Broughton had some little difficulty in getting a guide, but at length induced a native with the imposing name of Solomon Wesley, and his son, a lad of about seventeen years of age, to accompany us. The principal object we had in taking the son, was to enable his father to return, as would be necessary, in a small canoe. There are a number of families connected with this post surnamed Wesley, and the Christian names are, with few exceptions, taken from the Scriptures. It is owing, no doubt, to the fact that a Wesleyan minister was the first Protestant missionary in this part of the territory.

Bidding farewell to our kind friends, we left Albany at 7 a.m. with every prospect of making a good trip, the weather and wind being favourable. The lowness of the coast and extreme shallowness of the water are the most remarkable features. At no time after leaving the mouth of the river were we for the first three or four hours nearer to the shore than one mile and frequently two miles, and yet the bottom could be easily touched with a paddle. At high water, however, vessels drawing eight feet of water can enter the river and proceed up to the Factory. Out towards sea it is dull and hazy, as it usually is,

so far as my experience goes, on this Bay. Often there is illusive appearance of land in the distance, the combined effect probably of fog and the mirage. A wide belt of marsh covered with grass intervenes between ordinary high water and the woods, which seem to be sometimes as much as three or four miles distant. We did not (indeed could not, without wading a long way) land anywhere for some five hours. A low reef, covered when the tide is in, at length afforded us the desired opportunity. All haste was made to boil our kettle, the wood and water for that purpose having been brought with us from Albany. There was barely time to do this before the rising tide compelled us to take to the canoe and eat our dinner on board. This, thanks to the thoughtful kindness of Mr. and Mrs. Broughton, was not difficult, inasmuch as they had provided and sent for our use a nice fillet of veal already cooked, with some excellent fresh butter and fermented bread, luxuries in which, until our arrival at Albany, we had not indulged for two months. We did not land again until evening, when it was necessary to do so in order to camp. Distance from Albany about thirty-five miles. Mosquitoes numerous, and of a singularly light colour, almost indeed white.

August 9th.—Barometer 29.95.

Started at 5.40 a.m. Course from S.E. to S.S.E. At seven we landed for a short time at the most northerly Cock point. A large number of boulders are collected here, composed of different kinds of rock. Abundance also of sea-weed. Saw three white porpoises at a short distance. Again were obliged to take dinner on a reef. About 2 p.m. we had to make a portage across a reef which extended from the shore a long way out into the bay. These reefs, which are very frequent, are composed almost entirely of boulders. At 5.30 we camped, our guide stating that there was no good landing or suitable camping ground for a considerable distance. Found sufficient drift-wood for our fire, but had great difficulty in obtaining any fresh water. The coast low and flat, and very shallow throughout.

August 10th.—We were up at half-past four, about which the tide was in, and we could have embarked easily had the weather been favourable. It was, however, blowing too hard, and we had to wait. About noon, the wind having moderated, we succeeded in getting off, but the canoe and all our things had to be carried out fully half-a-mile to meet the returning tide. Shortly after we bumped very heavily on a boulder, and if our canoe had not been strongly ribbed I suspect it would have sustained more serious injury, and probably filled. As it was, although it leaked badly, we kept on until we reached what is called the North Bluff about half-past six in the evening. Here we landed and camped for the night. The Hudson's Bay Company have a beacon here, seemingly 100 feet in height, and of good substantial material and workmanship. The distance from Moose Factory is not now more than sixteen miles.

August 11th.—This morning was very stormy and wet, and we were unable to move. Many wild geese, ducks and plover had been seen between Albany and the High or North Bluff. While storm-stayed here, our old guide and his son took their guns and went off to a marshy, low-lying part of the coast to the north of our camp. After an absence of four or five hours, they returned with the following bag, which, considering the primitive-looking single-barrelled guns they carried, was not at all bad :

	Weight.
Four brace Pintailed Duck, or "Minnik".....	3 lbs. each.
Two brace Grey Duck.....	$2\frac{1}{4}$ " "
Seven brace Large Plover.....	$10\frac{3}{4}$ oz. "
One brace Yellow-Leg Plover..... net weight, say 6	" "
Half brace Curlew.....	9 " "

When James' Bay is accessible to the sportsman by rail, and game becomes scarcer elsewhere, I have no doubt whatever that many will come to enjoy the wild-fowl, plover and snipe shooting to be had here, from the middle of August to the middle of October. Further north, on the numerous islands in James' and Hudson's Bay, it is probable that good grouse and ptarmigan shooting may be found. The country between Lake Superior and James' Bay offers no attraction whatever in respect of game. But on the shores and islands of Hudson's Bay, including, of course, James' Bay, there are almost incredible numbers of geese and other wild-fowl, which find here the safest and least disturbed

breeding ground on the continent, together with abundance of suitable food. The advent of the "sportsman" under these circumstances is only a question of time.

August 12th.—Sunday.

Still stormy. Water brackish and bad; but no better to be had, so have to make the best of it. What is called the "bluff" is a low, gravelly ridge of not more than a quarter of a mile in length, and elevated, I should say, not more than ten feet above spring tides. On the top a considerable number of wild strawberries, now ripe, are growing. On the slope quantities of vetches and peas. I had some of these gathered and boiled, but they were not by any means good.

August 13th.—Barometer 30.

Started at 7.25 a.m., both wind and weather being favourable, and stopping only at Middleboro' Island for dinner, reached Moose Factory at 2 p.m. Here, it is needless to say, we were kindly welcomed by James L. Cotter, Esq., the officer in charge of this department.

Our actual voyaging time, from Albany to Moose, was three days, and the distance is, I think, about 100 miles. I fully expected that Mr. Broughton, who intended to leave Albany the day after us, would have reached Moose Factory before us. But he, like ourselves, had been storm-stayed, and did not arrive until this evening.

August 14th.—I was glad to find that there was no criminal business to detain me at Moose. I hope that before anything serious of that nature has to be dealt with the Award of the Arbitrators may have been confirmed, and a lock-up built here. A constable, too, would needs be appointed and paid by the Provincial Government. Conscious of the difficulties of the position, and of the disadvantage at which we are placed, I have abstained, as far as possible, from weakening the hands of the Hon. Hudson's Bay Company's officers, by any interference in little misunderstandings between them and their servants, leaving such to be settled in the way that they have always been. Cases, however, have occurred, and will occur, which should be decided by a disinterested, impartial and independent man. I took with me the Commissions appointing James L. Cotter, Esq., of Moose Factory, and W. K. Broughton, Esq., of Albany Factory, Justices of the Peace, and administered to them the usual oaths. As these gentlemen are both officers of the Hudson's Bay Company, it is desirable that there should be some others placed on the roll who are not directly connected with or dependent on the Company. I would, therefore, respectfully recommend that the Right Rev. Dr. Horden, Bishop of Mooseonee, and Archdeacon Vincent, be also appointed Justices of the Peace for this District. I am persuaded that under ordinary circumstances these reverend gentlemen might decline to act, but where they are the only eligible parties in the territory for the position, I trust that they may be induced to do so.

August 15th.—Mr. Spencer and his family started to-day with two canoes and six or seven men for Michipicoten. Mr. Spencer is in charge of one of the Hudson's Bay Company's Posts on the East-main coast, and is taking his children to the neighbourhood of Saugeen, there being no opportunity of obtaining a suitable education for them in the territory. A sufficiently endowed and well-conducted school at Moose Factory would be one of the greatest blessings that could be bestowed on the natives of this district. The Federal Government take from the people from ten to twelve thousand dollars a year in taxes, and not one penny is given back to them in any way that is known to me. The people are very dissatisfied, and I don't wonder at it.

Having obtained from the Hudson's Bay Company sufficient provisions to last us to Brunswick, and learning that the water is falling rapidly in the river, and rendering navigation more tedious and difficult every day, I propose starting out on our return to-morrow, if all be well.

FROM MOOSE FACTORY TO NEW BRUNSWICK.

August 16th.—Mr. Cotter having engaged a guide to accompany us, we bade adieu to all our friends and acquaintances at Moose, and with the usual honours took our departure. It was three o'clock in the afternoon, and our first camp was not more than seven or eight miles from the Post.

Having travelled this route on two occasions already, in 1879 and 1880, and described the principal features of the country passed through, in my Reports for those years, I shall have little to say that is new in regard to it.

August 17th.—Water in the river very shallow and progress slow. Second camp on Little Asp Island, not more than twenty-five miles from Moose Factory.

August 18th.—Started at 5 a.m. Stopped to examine the "White Rocks," or gypsum beds, as we passed. This was one of the hottest days of the season, and ended in a thunderstorm, which compelled us to camp a little earlier than usual some three or four miles below the forks.

August 19th.—This being Sunday, we remained in camp.

August 20th.—Barometer low, 29.4.

The morning wet, so got breakfast before we started. Left camp at 7.15 a.m. At 9 a.m. we came to the forks, or junction of the Mattagami and Missinaibi rivers. This, roughly estimated, is about fifty miles from Moose Factory. We pursue our journey up the right hand or Missinaibi branch. Constant poling and tracking, and our progress slow and laborious. Camped about seven miles below the "Long Rapid," which is generally assumed to be half-way between Moose Factory and Long Portage.

August 21st.—Started at 6.40 a.m. Another wet morning. Some fine large spruce, four to eight feet in circumference, at last camp. At the rapid just mentioned, I stopped to look at a bed of lignite coal, on the right bank, discovered by one of my voyageurs named "Michoo" in 1880. It is now mostly covered with loose stones and shingle, but is still visible in two or three places. I then estimated the thickness of this seam or bed at about three feet. The quality, I think, is equal, if not superior, to any I have seen on this side the Height of Land. We finally camped some nine miles above the foot of this rapid.

August 22nd.—It was nearly seven when we started this morning. No care, consistent with anything like reasonable progress, can save a canoe from injury in the present shallow condition of the river, and ours is badly damaged, and very leaky in spite of all the guide can do. After breakfast and a considerable time spent in gumming the canoe, we once more got under way.

River generally from five to six chains in width. Banks from sevety-five to one hundred feet in height. In the course of the day we passed the Wahboose, Ash and Poplar rivers, the latter a large tributary which falls in on the left side. We were overtaken with a very severe storm of wind and rain, one of the worst of the season, and camped on the north-west side a little above the junction of Poplar river.

August 23rd.—Barometer low, 29.15. Wind still very high, and weather threatening. Got breakfast over, canoe gummed, and started at 6.45 a.m. We had not proceeded far when rain began to pour down and continued with little intermission all day. What between tracking or towing along the beach through long grass and dripping willows, the necessity imposed on those in the canoe of now and again jumping overboard and wading considerable distances in order to lighten the canoe, and the rain, my crew had a very trying time of it, particularly as their feet, partly from the tracking, but chiefly from the continued wetness, were becoming very tender and sore. This was a new and hard experience for my young recruits from Toronto, but I was pleased to see how well they bore up under it, and how willingly they performed a fair share of even the hardest and most disagreeable of the duties that fall to the lot of the voyageur. We finally encamped on an island about three miles above the mouth of a stream called Shou-weska-sipi.

August 24th.—Barometer 29.7.

Started at 7 a.m. The river is still from four to six chains in width, but shallow and full of boulders. No rock *in situ* has yet been seen above water, although there cannot be a doubt that the Silurian and Devonian strata met with on the Kenogami, Albany, Mattagami and Abitibi rivers underlie the whole country through which we have been passing. About mid-day the river decreased in width, but became deeper. At 3.45 p.m. we came to the junction, on the right, of the Wabiskagami river; and three-quarters of a mile beyond that, on the same (north) side, the site where "Old Brunswick," a trading-post of the Hudson's Bay Company, once stood. The soil here is a brownish, sandy loam of good quality; and there is, I have little doubt, a tract of very fair arable

land lying here, between the Missinaibi and Wabiskagami rivers. The little stream is at present little more than a chain wide. About four and a-half or five miles above the junction we camped for the night. Immediately opposite the camp, and on the south side of the river, is the bed of Kaolin, or China clay, discovered by me in 1880, and the nature and extent of which I was then unable to ascertain owing to the high flood which prevailed in the river. I purpose examining it before leaving in the morning.

August 25th.—As soon as the canoe was gummed and ready to launch, I crossed over the river to examine the deposit of clay just referred to. The water being much lower than when I was last here, I could at once see that the quantity greatly exceeded what I had then any reason to suppose. It is in the form of a stratum or bed, the thickness of which is not less, I believe, than ten or twelve feet. It repose on a bed of white sand with the slightest possible tint of yellow. Above the clay is another stratum of the whitest sand I have yet seen in Canada. This is upwards of twenty feet in thickness. The clay is perfectly pure, and white in some places and bright red in others. At the outcrop where it has been exposed to the action of the water of the river when flooded, it is a good deal confused and mixed, so that it is not easy to obtain it in a state of purity. I am sanguine, however, in my belief that when opened up the two clays will be found to be separate and distinct, and that it may be obtained in a state of purity. The sand is admirably adapted for the making of glass of the finest quality. These interesting deposits can be traced for nearly half a mile in the banks of the river, and I have no doubt are of such extent as to be practically inexhaustible. The banks on both sides are high, say from eighty to one hundred and twenty feet. The upper white sand is seemingly overlaid by boulder or drift clay, and numerous deep ravines extend upwards from the river towards the plateau above. About three hours, during which we probably made six miles, brought us to Coal Brook, a small stream on the left, on which there is a bed of lignite coal. The lignite, of which pieces may be seen at any time on the sand or gravel bank at the junction, is found in place about half a mile up the brook, where it appears in the bank on the south side. It is decomposed and impure, as might be expected at the outcrop, where it has been long exposed to the action of the air and water. This coal was seen and described, if not first discovered, by Dr. Bell. In its present undeveloped state it is impossible to speak very confidently either of the quality of the coal or thickness of the seams, for I am inclined to think there are several. On the whole it has, in my opinion, a promising appearance, and in connection with the deposits of China clay and sand, only a few miles below, may some day prove exceedingly valuable.

Resuming our journey, three hours' brisk paddling against a moderate current brought us to Round Bay, at the foot of a formidable succession of rapids, in a gorge, walled in on both sides by steep and in many places perpendicular banks upwards of one hundred feet in height. This has been named "Hell-gates" by the old voyageurs. At the last of these rapids, some two or three miles above Round Bay, the river is no longer navigable, and a portage called Long Portage commences. The day was now well advanced, and, as the ascent of these rapids would I expected not only tax the energies of my crew to the utmost, but occupy several hours, I concluded to camp here at Round Bay for the night.

Here in this gorge is the first rock usually seen *in situ*, with the exception of the White-rocks or gypsum beds, from Moose Factory to Long Portage, a distance by the river of more than 130 miles. Here we have in all probability the southern boundary of the great plain, and its underlaying Silurian and Devonian strata. This plain extends in a northerly direction to the shore of James' Bay, and in a north-westerly direction, I believe, to the mouth of the Severn river, some five hundred miles distant. I am inclined to think that the underlying flat rocks are even much more extensive than the plain itself, and extend far out into Hudson's Bay, on the western side more especially. They consist, so far as I have had a opportunity of examining them, chiefly of rather thinly-bedded limestones, light-coloured and variegated sandstones, almost invariably more or less calcareous; dark, purplish and greenish-coloured shales, sometimes in the banks of rivers decomposing, and assuming the appearance of reddish or mottled clays or marls. The lowest rock in the series that I have met with is a mottled, reddish-brown and greenish, grey, indurated clay, probably a decomposing shale or slate, to be seen when the water is

low on the east side of the Abitibi river, between the Clay Falls and Sextant Rapid. It is upwards of six feet in thickness; how much more I could not see, as it was partly under water. Above this there was a bed eight feet in thickness of very coarse red or grey sandstone, somewhat soft and easily crumbled, and which reminded me of "Old Red Sandstone." From the lower end of "the long rapid or ripple" to the Otters' Rapids and Portage on the Abitibi river, we have, in my opinion, one of the best exposures in this territory of the rocks which underlie such a vast extent of country to the north and west. I have often regretted that I did not know how rare such exposures were in this territory, or I should have examined and studied the formation in 1881 much more carefully than I then did. There is no such exposure on any of the other rivers that I have explored, and I mention this for the information of geologists or others who may travel that route and feel an interest in the subject.

From this, Round Bay, to the Height of Land, and thence to Lake Superior, Laurentian and Huronian rocks are the only ones found "in place." Immediately below our camp, on the opposite or north-west side, is what at first sight appears to be a high bank of clay or sand. It is partly composed of a fine soft, light-grey sand, and partly of mixed sand and clay. I took samples of these, and on afterwards testing the fine, soft-feeling sand referred to, was surprised to find, not only that it effervesced when treated with muriatic-acid, but was almost completely dissolved, thus proving not a true sand at all, but rather comminuted or powdered carbonate of lime.

As regards the land, I shall merely observe here, that on this Missinaibi branch of Moose river, although peat-mosses, here as elsewhere, cover the far greater part of the plain, yet, I think, from its junction with the Mattagami to this point (Round Bay) there is a larger proportion of arable land than on any other river, the Kenogami excepted, on this side the Height of Land. This is owing to the greater elevation, as I think, of the plain above the river, and to the greater prevalence of gravelly or sandy loams overlying the clay for a greater or less distance on each side of the river and its tributaries.

The timber consists of aspen, spruce, birch, tamarac, poplar, balsam and cedar, and between Old Brunswick and our present camp I observed some few elm and black ash. There is a spruce tree close by our present camp which measures ninety-one inches in circumference, and a fair sprinkling of others around from forty to sixty inches circumference. The belt of good sizeable trees of any kind is confined, however, to the immediate banks of the rivers and streams.

August 26th.—About ten minutes after we started this morning we came to the first strong rapid. This appeared too heavy to ascend by poling, and three of my crew jumped ashore with the tow-line, the bowsman and steersman assisting with their poles. When just at the worst part and every man's strength was taxed to the utmost, the line parted and the canoe was swept down the rapid. This might have resulted disastrously, but fortunately our frail craft did not strike on any of the rocks or boulders until we succeeded in bringing it up again in the eddy. Doubling the line, we tried it again and succeeded. There are eight rapids in all. At three of these the line had to be used; the others were poled up. It required two hours and a half to make this stretch, the length of which does not exceed, I think, two miles.

The deep gorge in which the river here flows has a magnetic course or bearing—nearly north and south. When I first passed this way, it seemed to me that the gigantic task of excavating this channel had been performed by the water of the river, aided only by the frost in winter, the powerful action of which in splitting and destroying the hardest rocks is well known. I am now of opinion, however, that it owes its existence largely to glacial action, supplemented to a greater or less extent by that of the water and frost. The river here is from two and a half to three chains wide and full of rocks. The banks are composed of schists, generally micaceous, traversed by numerous granite dykes or veins, and which are supposed to belong to the Huronian system. They rise to a height of from 100 to 150 feet, and where the slope will admit, are covered with more or less soil, bearing a growth of mixed timber. I have hardly a doubt that on the top of these apparently rocky and sometimes precipitous banks, boulder and drift clays and sands will be found covering the entire surface to a considerable depth, and that outside

the channel of the river little, if any, bare rock can be seen. None of the veins that I examined contained any ore or metal of economic value and importance. Long Portage is on the east side, and one mile in length.

The rest of the day was consumed in getting our things over the portage, and when we camped at the upper end, everything had been brought across but the canoe. The fall here, by Dr. Bell's measurement, is 140 feet. The soil on the portage is a light clay loam. A short distance east of the trail I saw good spruce from four to six feet circumference, and medium-sized aspen, poplar, birch and balsam, and a luxuriant growth of grass near the lower end.

August 27th.—The canoe having been brought across and breakfast over, we continued our ascent of the river. The rock at the upper end of the rapids is gneiss. A tributary falls in on the west side immediately above the rapids. Forty minutes took us to the next portage, called "Storehouse" portage, from the fact that the company had a storehouse at the upper end. Here passing travellers were wont to register their names and the date of their arrival, destination, etc., on the logs and beams; but on crossing over the portage I found that the house had been burnt, apparently not very long ago. It must have been set on fire, or struck with lightning, as there was no appearance of its having resulted from bush fires. This portage is on the east side also, about half a mile long, with a rise of seventy-five or eighty feet.

About an hour brought us from Storehouse to Conjuring House Portage. We were greatly delayed this stretch (which is short) by the shallowness of the water and number of boulders. The portage here is on the right or west side, and about half a mile long. It had been rendered quite impassable by a windfall. This had been caused by a hurricane so severe that every tree almost had gone down before it. If Mr. Spencer's men had not chopped it out roughly, it would have taken us more than a day to have got across. Having at length got over this, a few hundred yards took us to the next portage, called Riverside Portage, one-third of a mile in length and on the west side. This was also in a very bad state, but the men after a long and hard struggle succeeded in taking the canoe and its load (with the exception of a little pork and flour left at the lower end in case of accident) up the rapid. A short distance above this we ascended a very strong rapid with the aid of the tow-line, and in another mile camped for the night. It had rained for some time before we stopped to camp, and what with the rain and the leakiness of the canoe, almost everything we had was more or less wet.

The country is low and does not show to much advantage. The river is full of reefs and rocks of gneiss, and the water so shallow that our progress to-day has been very discouraging.

August 28th.—From the time we started in the morning until one o'clock in the afternoon, the character of the country and of the river continued the same as yesterday afternoon. The river is one continued rapid, necessitating the constant use of our poles. It is even shallower than yesterday, and its bed covered with boulders and sharp rocks. In order to save the canoe and make any progress at all, the men are obliged to get out and wade, and what with stumbling over rocks and into holes, are frequently wet to their waists. They try to keep me as dry as they can, but sometimes I have to turn out also. With the long Esquimaux sealskin boots, which I now consider a necessary part of my outfit, particularly when voyaging on the coast, one can wade for a long time in water, not too deep, without inconvenience. On this occasion, however, my guide's feet had become so sore from being constantly wet from morning to night, and day after day, for more than a week, that he was hardly able to walk, and I let him and my bowsman, who was nearly as bad, have the only boots of that kind I had got. Indeed all the party about this time were so lame, with the exception of Mr. H. C. Hamilton, that it was with the greatest pain and difficulty they could cross the portages or leave the camp to bring a stick of wood for the fire, especially over uneven rocky ground. In spite of all our care, the canoe was so much damaged that at the end of three miles we had to go ashore for repairs, which took nearly two hours to make good. While these were making I went back on the east side. The country was low and flat, and must be extensively flooded at the time of the spring freshet. There was a few inches of good mould on the top, but below that it was very stony. Timber—spruce, poplar, and a few aspen of not much

account. The rock "in place" is still gneiss. At least ten per cent. of the gravel on the beach is limestone, and larger pieces, identical with those met with below the Long Portage, are quite common. I am collecting and numbering a few pieces daily, and will continue doing so, if I can find them, until I cross the Height of Land.

About a mile above this place we enter on a fine stretch of slack-water, where the voyageurs laid aside their poles and took to their paddles. About five miles of this, interrupted by two or three small rapids, brought us to the mouth of a good-sized stream on the west side called the Mattawishquia. The land bordering on this stretch is somewhat better, particularly on the west side. The timber, mostly a second growth of aspen and poplar, with some tamarac. Spruce is much less general than below the Long Portage. Rock, gneiss, the strike of which is generally E.N.E. and W.S.W. Near the mouth of the Mattawishquia we found a stiff clay on the east side, overlying which there was sand to the depth of several feet. Two miles above the junction the river again becomes rapid, and poling becomes the order of the day. Forty minutes of this brought us abreast of Lower Skunk Island, and another hour to the upper end of the Middle Skunk, where we camped for the night.

August 29th.—Started at 5.55 a.m., and at 6.10 a.m. pass the Upper Skunk Island. At 6.40 we came to the foot of a rapid, from which to Kettle Falls, not more than three-quarters of a mile, the river is so shallow and full of sharp rocks that it took nearly an hour to get there. This portage is on the west side and is only about 100 yards in length. The fall is about ten feet at present. When the river is flooded, it may be a few feet more or less.

The rock here is micaceous-gneiss, the strike of which is seemingly a little north of east, and dip nearly vertical. It is banded in its structure, the bands being often no more than a few inches in thickness and of unequal hardness. These are crossed by numerous small veins, either diagonally or at right angles, also of harder material. The action of the water, and the stones and sand carried down by the river when flooded, or possibly glacial action in other places, has caused an unequal wearing of the surface; the more micaceous bands, being the softest, have worn away most rapidly, leaving the harder bands and veins standing up. Thus this rock is at times fluted, and at others reticulated in a marked and singular manner. The harder bands and veins are more quartzose, and sometimes granitic. The depressions and elevations remind one of the crowns of huge molar-teeth. If we can imagine a sheet of ice several thousand feet deep with imbedded Silurian and Devonian rocks pushed over these molars with irresistible force and under tremendous pressure, we may perhaps have a glimpse of one of nature's mills which grind slowly it may be, but exceedingly fine, and accounts, possibly, for the great deposits of clay marls, calcareous gravels and sands extending southwards to the shores of Lake Superior. This fluted and reticulated character of the gneiss is not confined to this spot, but is seen wherever the rock is exposed, for many miles both above and below. In some places where there is a larger spot of the softer material pot-holes have been formed, and it is to this circumstance, I believe, that the name of "Kettle" Falls owes its origin.

Above this we encountered a long succession of rapids, requiring, with the exception of a short stretch near Black Feather rapid, constant poling. It took three hours to reach Muka-tai-qua-nai portage. A demi-charge only was made here, the canoe and some of our things having been poled up the rapid.

In half-an-hour from the time we left the upper end of this portage we came where the river expands from four or five chains, its usual width, to more like a quarter of a mile, with a good sized island called Skiminis. About the end of the next half-hour a stream ten yards wide falls in on the west. An hour and a-quarter from this point, during part of which time the current admitted of the use of paddles, brought us to Rocky Island portage. Our things were for the most part carried over, but the canoe with a few articles was poled up the rapid, which seemed to me a very difficult and dangerous thing to do, and what, I think, my voyageurs would never have attempted but for the soreness of their feet and the pain they would have suffered in carrying a heavy and water-soaked canoe over this rough and rocky portage. The fall here is ten feet in about quarter of a mile.

We camped about a mile above this portage.

The land, as seen to-day, is if anything a little higher, the ridges sometimes rising twenty-five to thirty feet above the river. The subsoil is clay, and sometimes the soil also is a clay-loam; but generally the clay is covered to a greater or less depth (at least near the river) with sandy-loam or gravel, and on some areas there are a good many boulders. The timber has been of the usual character, with the exception of cedar, which is now more frequently met with and of larger size.

¹¹⁹² There is little or no change in the rock, excepting that on Island Portage the rock bore a very strong resemblance to that seen at the Smooth-rock Falls on the Mattagami, and which, I think, Dr. Bell considers to be Huronian.

August 30th.—Barometer 29.3. Weather showery.

Started at 7.20 a.m., having concluded to take breakfast in camp, the canoe, as usual, requiring extensive repairs. We soon entered on a nice, smooth stretch of river, the width of which is still four or five chains. The current being moderate, and water sufficiently deep, we were able to use paddles and make good progress. About six miles from camp, or say seven miles from Island Portage, brought us to Ka-ka-gee rapid, up which the canoe was poled. Another stretch of six or seven miles ended at Smooth-water Fall, where it was necessary to make a portage, the fall in the river at that point being estimated at twenty-five feet. Two miles above this we met with another portage called Sharp-rock Portage, the Sharp-rock river falling in on east side, a little below the portage. Little over a mile from this we came to the Little Beaver rapid and portage, but this was poled up. Half a mile or less then brought us to the Upper or Big Beaver portage, some quarter of a mile in length and twenty-four feet of fall. Here we camped for the night.

The land seen to-day is better on the whole than on any other since we left Round Bay, below the Long Portage. The banks of the river have generally been higher, and good points of river bottom land, with alluvial soil, carrying a fine, healthy growth of timber, have been frequently passed. The ridges rise, in some instances, forty feet above the river, and land slides, the result of a clay subsoil, are more common.

Aspen, poplar, birch and spruce are the most common trees, and, judging from the description, size and healthiness of the timber, the land is, I think, fully better on the west than on the east side. In some of the smoother stretches, a luxuriant growth of grass, willows and alders are seen covering the banks, and, behind this fringe, cedar, poplar, aspen, birch and spruce. In a few places black-ash also was noticed. I observed to-day, also, in some parts of the smoother stretches, a grass with arrow-headed blades, which grows generally in rather shallow water near the bank, and of which I have been told the wild-geese are very fond. I have seen this grass in the upper stretches of all the rivers on this side the Height of Land, and most commonly at about this elevation. I have met with it, also, below the Long Portages, but in smaller patches, and more rarely.

Many pieces of fossiliferous limestone still appear among the stones and gravel on the beaches of the river. The rock met with *in situ* has been chiefly the micaceous-gneiss before mentioned. At this Upper Beaver Portage, however, I noticed a strong resemblance between the rock and that at Sturgeon Fall on the Mattagami. Here, however, in addition to the trap with the same peculiar spots, we have what I take to be quartzite.

August 31st.—Barometer 29.4.

Leaving our camp at Beaver Portage at six o'clock in the morning, we reached and made our next camp on Sugar-leaf Portage, at exactly six o'clock in the evening. About half-past nine (having breakfasted in the interval) we came to Albany Rapids. At the lower end of these rapids a demi-charge had to be made, and this was followed by a long stretch of heavy poling. An hour and a half later we arrived at the mouth of a river which enters the Missinaibi from the west. It is the largest tributary that we have seen since we left the Long Portage, being from two to two and a half chains in width, and discharging a considerable quantity of water. It is called the Albany river, but has no connection that I know of with the Great Albany river previously referred to in this report, and which forms the north-western boundary of the territory awarded to our Province. It may be, however, that there is a route up this river by which Indians in small canoes can strike the head waters of some of the tributaries of the Kenogami, or even of the Albany itself. My guide, belonging as he does, to Moose Factory, knows

nothing of the country, or of the tributaries of this river, which is unfortunate. Passing on, the next portage was reached in four hours and a half. It was short, being over a rock only, and is called I think "The Devil's Cap." Another hour brought us to Sugar Loaf Portage where, as already said, we camped for the night.

As regards the land.—That next the river in the first stretches above Beaver Portage would make good meadows, but is probably flooded in the spring. About four miles above the portage, I went back a short distance, while breakfast was preparing, to examine the soil, and was rather disappointed to find that the timber of fair size on the bank was quite small and worthless a few hundred yards from it. On testing the soil I found it to be a fine light-colored sand. It is probable that the vegetable mould has been burnt off recently. The land opposite Albany Rapids is probably stony. Some two miles above these rapids there are a few fine alluvial points on the river. Two or three miles above this, at the dinner hour, I again went back, and although the timber at that point on the bottom land was healthy and good, it once more failed soon after reaching the top of the ridge, the aspen, birch and poplar, etc., found in the lower ground, giving place to small spruce. On trying the soil I found very little vegetable or leaf-mould here, but a hard, dry, light-coloured clay, which the roots of the trees seemed to be unable to penetrate. I expect that the soil has lost its vegetable-mould by fire, and has not yet had time to recuperate. Half way up the bank there was a sandy-loam, covered by a few inches of mould, and on the bottom land there was a foot in thickness of fine black mould resting on a mixed sand and clay soil. The subsoil as seen in the banks of the river is always clay.

The rock has been gneiss. In some places it has appeared—as massive gneiss—associated with trap dykes, and more or less of what I take for epidote, and which often has a polished surface when exposed to the action of the water and sand of the river.

September 1st.—Barometer 29.

We left this (Sugar Loaf) Portage at 5.40 a.m., and in thirty minutes reached the next, which is called Pond Portage. The former is on the west and the latter on the east side of the river. The fall here is about fifteen feet, and length of the portage about 200 yards. By the time all our things were across and breakfast over, it was eight o'clock when we got away from this portage. Boulder clays form the surface at both the last portages. In three-quarters of an hour we came to what are called the "Two Portages," but really only made one portage, and that somewhat shorter than the last. The fall in the rapid here is about eight feet, and my men lost a good deal of time trying to pole up it. The consequence was we did not get away from this portage until half-past ten. One hour's paddling brought us to the junction of Brunswick River, on the right or west side.

This river comes from Brunswick Lake, on which, after the abandonment, as I presume, of the old post of that name below Long Portage, another post called New Brunswick was established. This too was abandoned some years ago and Missinalibi, previous to that only a winter station, became the principal post. A family named Sanders, natives of the country, occupy, with the permission of the company, the buildings and land at New Brunswick. Expecting that I might be able to explore the country between New Brunswick and Long Lake, I had, before leaving Lake Superior, directed provisions to be sent to Michipicoten River, and wrote P. W. Bell, Esq., the officer in charge of the Lake Superior District, to be kind enough to have them forwarded to Missinalibi, and from thence, if any opportunity should occur, to New Brunswick.

We now therefore leave the Missinalibi and ascend this Brunswick branch or river. It is from a chain to two chains in width, and discharges a considerable quantity of water even at this season. The distance from the junction to the lake is about nine miles, and thence to the post three miles, or say twelve miles in all. The upward course of the river is nearly south, and from the outlet of the lake to the post about south-south-west. We were only obliged to make one portage, and that was about a mile above the junction, where there is a fall of about nine feet. The portage around this is on the right hand side and not more than one hundred yards in length. We came afterwards to several very strong rapids, the river at these points being only from ten to twenty yards in width, but these were ascended with the help of the tow-line, not however without a good deal of difficulty, and I have little doubt that when the water is high, portages become necessary

at some of these rapids. The total rise from the junction to Brunswick Lake is roughly estimated at about twenty-five feet. The rock is still gneiss. The timber is mostly a second growth, consisting chiefly of aspen, tamarac and poplar. The land skirting both sides of the river is low and flat, and sometimes wet, but most of it would make splendid meadows for either pasture or hay, for it is only flooded for a short time on the melting of the snow in spring. The subsoil is clay, and the soil generally a clay loam, though over some portions the soil is probably sandy.

It was about six o'clock in the evening when we got to the post. Mr. Sanders with his wife and daughters were the only persons at the place, and by them we were kindly welcomed. I was exceedingly glad to hear that our flour and one keg of pork had been forwarded from Michipicoten and been awaiting our arrival here for some weeks. Our trip from Moose Factory had been so difficult, and the time occupied so much longer than I expected, that our supply of pork was entirely exhausted, and even of flour we had but little remaining.

Mr. Sanders' sons, of whom he has several, and the Indians who hunt in the neighbourhood, had it appeared all gone to Michipicoten for supplies, and had not yet returned, although he expected them in a few days. One of these (James Sanders) was my guide and bowsman two years ago, and I had hoped to find him here in the event of my being able to explore the supposed fertile country between this and Long Lake, as originally intended. The necessity, however, I was placed under of going from Long Lake to Pic river for my supplies, and the great difficulty and delay we have experienced in ascending the Missinaibi river to this point, have, together, consumed so much time that it is now too late to carry out my original intention. In the present low stage of the water in the rivers, however, it would, I think, at any rate, be impossible to get through to Long Lake, and from thence to Lake Superior. This region can only be explored in the spring or early summer, when the rivers are moderately full, and then guides who know the country thoroughly will be indispensably necessary. This, therefore, must stand over until, at all events, another season, when, if the Government thinks it desirable, it can be done.

In the meantime it may not be out of place to quote here from the Report of Mr. Gamsby, Engineer-in-Charge of the survey for the Canadian Pacific Railway from Long Lake eastwards to Moose river (Missinaibi branch). The line then explored by him, and referred to in his Report, lies south of that which I proposed taking from this, or some point north of this, as might be determined upon after consultation with my guides.

Mr. Gamsby reports as follows:—

CANADIAN PACIFIC RAILWAY,
OFFICE OF THE ENGINEER-IN-CHIEF,
OTTAWA, 19th May, 1880.

SIR,—In accordance with your instructions, dated October 15th, 1879, forwarded by steamer to Red Rock, directing me to remain in the country during the winter and continue my explorations eastwards from Long Lake, I proceeded at once to re-organize my party and procure supplies for the work indicated. These supplies were landed at Jack Fish Bay, Lake Superior, and thence carried to our initial point at the outlet of Long Lake. On reaching Long Lake, we arranged our season's operations as follows:—One assistant, with a small party, to survey and sound a portion of Long Lake, with a view to ascertain the practicability of taking the line across the lake, and thus avoid the long detour by the northern end. Two other assistants to carry on the exploration eastward. I fixed my headquarters at the Hudson's Bay Company's Post, near the outlet of Long Lake, from where I could visit both parties and give particular attention to the proper distribution of supplies. This arrangement was found to work satisfactorily, and was continued to the completion of our work. The exploring party commenced work about the 13th January, running compass line and chaining distances. The country, for the first ten miles, was found to be slightly undulating, with low gravelly hills. From this point the ground rises gradually to the summit, between McKay's and Shallow Current Lakes, terminating at a gravelly ridge seventy or eighty feet in height. About one-half mile south of the line a lower pass exists, with an easier ascent and ground more undulating. From the 19th to the 27th mile the country is undulating and gravelly, and the work would be

classed as medium to light. From the 27th to the 34th mile, in the vicinity of Cross Lake, the ground is broken and rocky, particularly near the lake. A fair location may be obtained around the north shore of the lake by crossing a bay at the north-east end of about 250 feet in width. The southern shore is hemmed in by high rock bluffs, and appears impracticable. From the 34th to the 39th mile the country rises about one foot per 100 feet to a summit where a pass about 500 feet wide is found, a level spruce swamp. At the 39th mile a deep gorge is met, about 300 feet deep and forty chains in width. A detour of about one-half mile to the southward was made with the exploratory line, where a practicable crossing was found. I think a more uniform country would be found from five or six miles to the northward of the line explored. From the 39th to the 60th mile the country is chiefly swamp. Some streams are crossed, the largest about 100 feet wide; the banks are timbered with spruce, tamarac and cedar. From the 60th to the 73rd mile the exploration passes over a burnt country, with patches of green timber, undulating, with some gravelly ridges and light swamps. From the 73rd to the 102nd mile the country is generally undulating, with some low ridges of rock, some large timber —spruce, tamarac, cedar and occasional plantations of birch. From this point to the 108th mile we cross a burnt country, with small clumps of timber scattered through it. The soil for the most part is gravelly, and the ground undulating. From this point to Moose river the ground is rolling, being composed of alternate gravel ridges and swamps; timber mostly small pitch pine and poplar.

A fair line for railway construction can be located in the immediate vicinity of the line explored, but I am of opinion that a better line can be obtained by keeping to the westward of Sucker Lake; thence northward, crossing English river from one to three miles north of Long Lake; thence eastward, and crossing at the outlet of Shallow Current Lake; thence in a direct line to a branch of the Albany river. From near this river, Indians report a gravel ridge running the whole distance to New Brunswick House on the Moose river. In reference to the extent of arable land met with between the north end of Long Lake and Moose river along the line of exploration, I am of opinion that the belt in which good land is found does not extend much more than sixty miles northward from the Height of Land; but Dr. Bell, in his Geological Report of 1877-8, says, "After passing the 'swampy grounds,' north of Missinaibi Lake, the traveller cannot fail to be struck by the abundance and general fertility of the soil exposed on the banks of the Missinaibi and Moose rivers, all the way to Moose Factory. I examined the country for a mile or two back of the river in several places, for the purpose of ascertaining the nature of the soil, and found it excellent in all cases, but tending to become more swampy in receding from the river in the region below the Long Portage." From this it would appear that the fertile soil in the vicinity of the rivers is not confined to the sixty mile belt north of the Height of Land. In a report made of a survey from the Missinaibi and Moose rivers eastward, during the summer of 1871, I called your attention to the extent and general fertility of soil met with. This examination and survey was made at a season when the vegetation is at its best; it was its luxuriance, together with the size and abundance of the timber, which first called our attention to the soil. It was from the general similarity of the country passed over, during the exploratory survey of last winter to the above region, that led us to infer the fertility of the soil. A considerable extent of it is found around Long Lake, on both the eastern and western shores. From the eastern shore of the lake along the line of exploration, the fertile soil, gravel ridges and swampy ground appears to be about equally divided for the first forty miles. From the 40th mile to the 60th, from the 70th to the 95th, and from the 120th, fertile soil appears to predominate. It is in these belts that the rivers are found, in the vicinity of which the soil is good. Owing to the peculiar circumstances in which we were placed, our examination of the country only extended from five to ten miles on either side of the explored line. Comparing the country along those rivers with that along the Missinaibi (branch of) Moose river, from their similarity, I would infer that the soil would be the same in character and extent. Considerable tracts of clay land were met with, similar to that at the Hudson's Bay Company's Post on Long Lake, where vegetables, coarse grain and timothy are successfully grown. On the river bottom, spruce, tamarac and cedar timber abound, the largest ranging from one to three and a-half feet in dia-

meter. A considerable area of burnt country was passed through. In the winter we had no means of judging of the soil, excepting that the fact of its having been burnt over, would lead to the conclusion that it was dry, probably a sandy loam. As I have observed, that soil predominates in burnt districts, and although not to be classed with the clay soils, it produces legumenous plants and the clovers in abundance when brought under proper cultivation. In conclusion, I heartily agree with Dr. Bell, who says in Report to above, "I have no doubt that at some future time this territory will support a large population."

Respectfully submitted.

I have the honour to be, sir,

Your most obedient and humble servant,

C. H. GAMSBY.

SANDFORD FLEMING, C.M.G.,

Engineer-in-Chief, Canadian Pacific Railway.

September 2nd.—This being Sunday and the canoe requiring to be repaired, and our clothes and blankets to be dried, we were glad of a day's rest.

I had hoped to have been able to procure a few potatoes here, but was sorry to find that the crop, owing to the cold, wet spring, and the undrained clay-soil on which they had been planted, was a complete failure. After living for three months on salt pork, with hardly any vegetable food worth mentioning, excepting flour, there is a craving for what may be called green vegetables, roots and fruits, and those who do not care for such at other times and under other circumstances, relish them greatly. This indicates a want in the system not supplied by a bread and pork diet. The hint thus given by nature should not be neglected, for long before the voyageur is prostrated with scurvy his constitution and health are likely to suffer.

Mr. Sanders has been a canoe-builder for the Hudson's Bay Company for many years, indeed I think he said that he had served the company in that capacity for thirty-five years. For a long time, and until the last two years, he lived at Flying Post, which is about ninety or one hundred miles north-east of Brunswick. He has had twenty children by his wife, who is still living. Of this fine family seventeen or eighteen survive, about one-half of whom remain with their parents. Their object in coming here was to farm or cultivate the land during the summer, and trap for furs during the winter. The chief reason for selecting this particular spot, was that there were a couple of dwelling houses, storehouse and stable already on the ground, and several acres of land cleared. These were no longer required by the Hudson's Bay Company, the business having been removed to Missinaibi, and the officer in charge of the district was willing that they should occupy the premises, which otherwise would doubtless have been burnt down in a few years. With these advantages, however, the place has many drawbacks. In addition to its complete isolation, and the absence of a market for any surplus produce they may raise, there is the difficulty of getting seed, stock, and agricultural implements. All of these have at present to be brought by canoe from Michipicoten, a distance of not less than 150 miles. But above all, I fear the greatest obstacle to their success is, that none of the family have had any opportunity of acquiring a knowledge of farming, a knowledge which is especially necessary when the soil is a clay-loam like that they have here. See my Report for 1879-80, p. 9, and Report for 1881-2, p. 9, for further information in reference to this post.

FROM NEW BRUNSWICK TO MICHIPICOTEN, LAKE SUPERIOR.

September 3rd.—Everything being ready, we bade good-bye to Mr. Sanders and his family, and started on our homeward journey early this morning. Three hours and a half took us to the portage near the south-eastern extremity of the lake. This makes the distance probably about twelve miles. We have here on this lake a few red pine, the first met with travelling south and the last when going north on this route. Crossing the portage, which is about a mile long, we embarked once more on the Missinaibi river. In

the stretch of the river commencing where we left it, at the junction of Brunswick river and terminating here, there are two or three rapids, but at these it is not necessary to make portages. It is now about two chains in width, generally of good depth, with a steady current. Extensive alluvial flats of land on the west side of the lake and on both sides of the river, which will some day be converted into fine meadows. Clays, all calcareous, are seen in the banks. In some places the clay is overlaid with sands or sandy-loam, but I think it more frequently forms the surface soil also. Very few stones or rocks are seen on the river now. The timber is mostly spruce-tamarac, with a mixture of poplar, aspen, birch and balsam. Cedar is now seen more frequently.

We reached the Thundering Falls in the evening, and camped at the upper end of the portage, which is sometimes called St. Paul's Portage. This portage is about 200 yards in length, and the fall, by Dr. Bell's measurement, is twenty feet.

September 4th.—Breakfasted and started 6.35 a.m. Barometer low—28.7—and threatening rain.

The banks of the river rise rather suddenly a short distance below the last portage, and now frequently attain an elevation of fifty feet. Land-slides are seen occasionally, and where thus exposed we find boulder or drift clays in the lower part, and overlaying these clays fine yellowish sand of irregular thickness, but sometimes as much as thirty feet. About two hours, exclusive of stoppages, sufficed to take us to the next portage, which is called "Split Rock," or St. Peter's Portage. The former is appropriate, as the river (usually two chains, or say 132 feet in width) here rushes through a chasm in the solid rock some twelve feet only in width. The fall here is probably about thirty feet, and the length of the portage 350 yards.

At the upper end of this portage I observed a tree on which was marked, "Poulin's Crossing, July 28, 1880," and below that "J. Galbraith, June 29th, 1881." The latter is the well-known and popular Professor of Civil Engineering in the Toronto University. The former, Mr. Poulin, was in charge of a party engaged in running an exploratory line for the Canada Pacific Railway, which I think it a great pity the Dominion Government did not insist upon being followed by the Syndicate, as it borders on, if not passes through, a section of country better adapted probably for settlement than any other north of the Height of Land, and much superior in that respect, as well as in an engineering point of view, to the line that has been finally located. It might have taken a little more time to make, but would have really cost much less. I have already quoted from the Report of Mr. Gamsby, the engineer in charge, to show the character of the country adjacent to their line from Long Lake to this crossing, and it may not be out of place now, again to quote from his Report what is therein stated in reference to the character of country lying to the westward of this crossing.

Under the head, "Report on Survey from Moose River, running eastward, to Lake Matagama," Mr. Gamsby reports as follows:

OTTAWA,

December 13th, 1880.

SIR.—I have the honour to report that, in conformity with your instructions of July 3rd, requesting me to proceed to Moose river, the eastern end of my exploration of last winter, and continue a compass line eastward to a junction line with Mr. Austin, who was proceeding west from Sturgeon river, I left Collingwood on the 8th July, and after experiencing some difficulty in procuring means of transport up the Michipicoten river, we reached our initial point on the 27th of the same month, and commenced operations, in accordance with those instructions, by running a compass line from the point above referred to, in a general south-east course, carefully noting the courses and chaining the distances, and obtaining such other information as the limited time at our disposal permitted. We reached the 116th mile of the exploration on the 9th October ult. Having arranged with Mr. Austin to make the connection between our lines and otherwise complete the exploration, I started on my return, following and traversing the canoe route between Matagama and Flying Post. This route is at some considerable distance south of the explored line, and its traverse enables us to lay down a number of lakes in our plan, the position of which will very materially affect the projected location of a railway line. It will facilitate the description of the soil, timber and general character of the

country explored, to divide it into several sections, as naturally divided by the larger streams flowing through it.

Section 1—Lies between the Moose and Kapaskasi rivers, and covers a distance of thirty-two miles along the line of exploration.

Section 2—Lies between the Kapaskasi and Nestodjiastona rivers, a distance of twenty-two miles.

Section 3—Lies between the Nestodjiastona and Ground Hog rivers, a distance of some sixteen miles.

Section 4—Lies between Ground Hog and Matagama rivers, a distance of forty-four miles.

In each of these sections the soil and general characteristics are different; the surface of the ground varying from lightly undulating to high ridges and broken, the soil varying from the clay and clay-loam of the first section, to the light sand of the fourth.

Section 1.—This section of thirty-two miles in length, and probably from thirty to sixty miles in width, from north to south, is lightly undulating, with gradual rise eastward. The soil is clayey-loam, or greyish mud mixed with vegetable mould. It is identical with the soil in the vicinity of the Hudson's Bay Post, called New Brunswick House, where the agent informed me that fine crops of coarse grains and roots were grown during the past season. Fully seventy per cent. of the soil of this section may be classed as very good. The remaining thirty per cent. is composed of inferior lands, gravel ridges and muskeg. Timber (birch, poplar, cedar, spruce and tamarac) is found in abundance, and in many localities of large size; the cedars are particularly fine. The other varieties will furnish large quantities of fuel when required.

Section 2.—This section, of twenty-two miles in length, is apparently of less width than section one. Broken and high ridges occur on which granite rock crops out. The clay and marl soil occurs only in belts, and is replaced by sandy loam, mixed with boulders. Probably fifty per cent. of the soil of this section would rank as good. The remaining portion, although not worthless, would be classed as inferior. A large portion of this section has been burned over; timber will be found only in the swamps on these portions. In the unburned portions a moderate quantity of white pine of fair size is found, mixed with the varieties prevailing on section one. No muskeg of any size occurs in this section.

Section 3.—This section, of about sixteen miles, has a fair proportion of clay soil, extending from the Nestodjiastona river, about four miles in a south-easterly direction to the Pishganagamee river. From the latter river to the end of the section the soil becomes sandy, with boulders, and although classed as inferior, I found fine crops of barley growing at the Hudson's Bay Company's Flying Post on Ground Hog Lake. The barley was stored at the time of my first visit, viz., September 15th. The potato vines had been touched with frost about that time, but were not killed till later on in the season. The timber of this section is very similar to that of section one, except that red pine takes the place of the spruce. Considerable quantities of red and white pine of good size are found throughout the whole of this section.

Section 4.—This section lies between the Ground Hog and Matagama rivers, a distance of forty-four miles along the explored line. It is much higher and more broken than the other sections. Considerable rock is met with on the higher ridges and around the lake shores. The soil is sandy-loam and boulders, and may be classed as inferior. Barley and oats of an inferior quality were grown at the Hudson's Bay Post on Mata-gama Lake. I think the poor quality of grain was owing to poor cultivation and the exhausted condition of the soil, rather than to any natural sterility. There is a great abundance of red pine growing on this section. It is tall, straight and sound, varying from four to fourteen inches in diameter; probably not up to the standard of lumber for exportation, but of great value for local and domestic uses. The numerous lakes and streams will afford an easy means of moving the raw material to points where water-power may be found for its manufacture. Means of transportation being furnished, there will spring up a large and increasing trade in the products of the forests between this section of the country and the prairies of the North-West. In considering the adaptability of this country for railway construction it will be necessary to divide it into two sections.

Section I.—From Moose river to Ground Hog river, a distance of seventy miles. A good alignment may be obtained in the immediate vicinity of the explored line. No exceptionally sharp curves will be required. The gradients for the most part will be light; any gradient heavier than one foot per 100 feet will be short, and, I think, need not exceed 1.25 feet per 100 feet or 66 feet per mile. The work I should classify as light to medium, with very little solid rock.

Section II.—From Ground Hog river to the Matagama river, a distance of forty-four miles, will require a careful examination with levels to determine the best location. If possible, the line should be placed further south than the explored line, in order to reach the south-west branch of the Matagama river, down the valley of which a good line may be found. Sharper curves and heavier gradients will be required on this section. The work will rank from medium to heavy, with some solid rock. The muskegs are not of a serious character, and are of small extent. As we cross seven distinct branches of the Moose river, considerable bridging will be required, but by careful selection of crossings, I think that not more than two spans of 100 feet each will be required over any of the streams.

All of which is respectfully submitted.

I have the honour to be, sir,

Your most obedient servant,

C. H. GAMSBY,
Engineer-in-Charge.

To COLLINGWOOD SCHREIBER,
Engineer-in-Chief.

Leaving the Split-rock or St. Peter's Portage, we encountered frequent rapids, and at one called "the Calf" we had to make a demi-charge, a portage, however, being necessary at this place when the water is high. I have found pieces of fossiferous limestone all the way from Long Portage to this point. They have never been long absent during any part of the route. Here they are not large but more than usually plentiful in the gravel at the lower end of the portage. The rock is still gneiss. It took us an hour and a quarter to get over the stretch from Split-rock to Calf Portage, and about two hours and a quarter from thence to Green Hill Portage. This is a mile in length, and the fall in the rapids is forty or forty-five feet. The land is dry and tolerably good on this portage. It is probably owing to the fresh, healthy verdure of the trees and bush that it owes its name. My voyageurs carried our baggage and supplies over the portage, but in view of the length of the portage and slippery state of the ground, it having come on to rain, they concluded to pole the canoe up the rapids. This they managed to do, after a long and hard struggle, in which my Toronto recruits, Messrs. Hamilton and Scott, are now able to take a very creditable part. To be able to pole well is of greater consequence on these rivers than simply to be a good paddler. Mr. Hamilton almost stumbled over a bear here—the first and only one seen on the trip. We camped for the night about two miles above this portage.

September 5th.—Barometer 29.

The land at our present camp is a good sandy-loam. Its elevation being not more than ten feet above the level of the water, it is no doubt flooded for a week or two in the spring, but only at that time. It bears a fine healthy growth of mixed forest-trees. I measured aspen fifty-two inches, spruce sixty inches, and tamarac thirty-six inches in circumference. Black ash is also more common but not large.

Soon after we had started we came to Wavy Rapid and Portage, whereat we only made a demi-charge. Portage 150 yards in length and fall about six feet. In twenty-five minutes more we came to an island and rapid where another portage called Island Portage, a quarter of a mile in length, had to be made. The fall here is considerable—probably twenty-five or thirty feet.

Rock, massive gneiss—a good deal like granite. As we proceed the land now becomes lower, wetter, and more swampy. The timber is mostly tamarac, spruce and cedar of small size. On the dry, sandy soils, for some time past, more or less Banksian pine has

been seen, but no white or red pine. In a mile and a half, or two miles, we come to a rapid which again demands the vigorous use of poles to ascend. This is succeeded at short intervals, by two or three other rapids, at the last of which there is a portage called The Foot of the Swampy Ground Portage. Here we met with Mr. Sanders' sons and several Indians returning from Michipicoten with a large canoe laden with their winter supplies. Among them were James Sanders and Jonah, both of whom had been with me at different times as guides. They promptly took our line and hauled our canoe and its load up the rapid, thus saving us a good deal of time. It was twelve o'clock when we got away from here, and shortly thereafter we entered what is called "The Lower Swampy Ground." As observed in a former report, these swampy grounds have been in all probability at one time lakes which are now partially drained. From where we enter this Lower Swampy Ground to where we leave it and re-enter the river will be nearly six miles. About three miles more brought us to a portage, at the upper end of which we camped for the night.

September 6th.—Started at 5.55 a.m., and at 6.40 arrived at Smallboy's Rapid and Portage. Fall about six feet, and length of the portage about 200 yards. Here I found many pieces of fossiliferous limestone, and a piece of dark-holed or spotted quartzite, which I believe must have come from James' Bay.

By the time everything had been got over the portage and breakfast taken, it was 8.30. Two rapids were met with in the next half-hour, and at the top of the last we passed a brook on the right called Nottawainse, and a few minutes later a small stream on the left or east side, the route taken by small canoes to Flying Post, and which I ascended in 1881. In another half hour, during which we had to contend with strong rapids, we again came to smooth water and entered the Upper Swampy Ground. About 11 a.m., or say in four miles, we had again left the Upper Swampy Ground and arrived at the first rapid and portage in the river above it. This rapid was poled up, and in half an hour was followed by another rapid, which was also poled up successfully. If the water in the river had been high it would have been necessary to make portages not only at these, but several other rapids which have been passed. We were now near Lake Missinaibi, and three-quarters of an hour's paddling sufficed to take us to the Hudson Bay Company's Post, where we were very kindly received and entertained by Mr. Wilson, the officer in charge.

When we left camp this morning the weather was fine and cool, but the thermometer was so low, that even making allowance for the height above the level of the sea, I was surprised, and began to think something had gone wrong with the instrument. It was right enough, however, for it came on rain before noon, and by two or three o'clock it was very wet. We were too glad, therefore, to accept of Mr. Wilson's hospitality and remain until morning. This will be the first night that we have slept in a house since we left Red Rock, three months ago.

September 7th.—Barometer 29.

We left the guide, Richard, who had come with us from Moose Factory, at this post, to return with Mr. Spencer, who had arrived here some four days before us. As Mr. Spencer left Moose Factory a day before us, and we had, with the exception of one half-day, refrained from voyaging on Sunday, as well as gone somewhat out of our way to call at New Brunswick, and as in addition to all this, frequent stoppages were made to enable me to examine the rocks, soil, timber, etc., I think my crew have held their own very fairly. In view of the long time we have taken it is satisfactory to have some standard to judge, and be judged by, and to know that my voyageurs, two of whom were, I may say, amateurs, have not been in any way responsible for it. Mr. Spencer's guide, "Smallboy," is considered the best at Moose Factory, and his crew was a strong one, composed entirely of experienced voyageurs. What has delayed both parties is simply the shallowness of the water, which sometimes renders both branches of Moose river almost unnavigable for large and at all heavily laden canoes.

For their food and the hope of a small present, two natives, named Mongoose and Guido, who were going to Michipicoten for their outfit, agreed to accompany us in their own canoes to supply the want of a guide and assist us on the portages. This and other arrangements completed, we took leave of Mr. Wilson and left Missinaibi Post at nine

o'clock. It took us about six hours to the first portage, and as we had a fair wind most of the way, the length of the lake between these points will be, I think, about twenty-two miles. This Missinaibi portage is 350 yards long and terminates at a lake called Crooked Lake, which is some fifteen feet only higher than Missinaibi. We do not see the point where the water of the former flows into the latter; but the water does flow into Lake Missinaibi. Having crossed the portage and embarked on Crooked Lake we proceeded about three miles further and camped for the night.

September 8th.—Barometer 29.

Starting at 5.42, a.m., and pursuing our way through a rather barren-looking country we reached the Height of Land portage at eight a.m. This stretch together with that made last night, makes the length of Crooked Lake, from portage to portage, roughly estimated about ten miles. This portage is some 200 yards in length and terminates at Dog Lake. Dog Lake is only a few feet lower than Crooked Lake, a difference which is probably still less in spring when the water is at its height. I should not be surprised if at that season Crooked Lake discharged part of its water into Dog Lake, and thence by Michipicoten River into Lake Superior, and another part as at present into Lake Missinaibi and thence into James' Bay.

Embarking on Dog Lake and pursuing a general course of W. S. W., we came in two hours to the point where the line of the Canada Pacific Railway crosses Dog Lake, which is here apparently narrow with islands in the channel. This will be about six miles from the Height of Land portage, and is said to be sixty miles from the mouth of Michipicoten River, the nearest point on Lake Superior at which supplies and materials for construction can be laid down by steamer. A little further on was the camp of Mr. Carry, the engineer in charge of the survey. In the party were several friends from Sault Ste. Marie, by whom we were cordially greeted, and from whom we were glad to obtain some tidings of home and of the outer world, however trifling. Mr. Carry was not at the camp, having gone to Michipicoten on business. A young gentleman of the party informed me in answer to an enquiry as to the elevation of Dog Lake, that Mr. McLennan, C.E., had made it he believed 1,025 feet above the "datum line" of the C. P. R., which is, I presume the level of the sea. This is, in all probability, approximately correct. In my Report for 1880-81, p. 5, the height of this lake is represented as being 554 feet above Lake Superior, or 1,152 feet above the level of the sea, on the authority of a map then in my possession; but my own barometrical observations agree more nearly with the lower elevation, as estimated by Mr. McLennan. Having stopped here about a quarter of an hour, we again resumed our journey which leads us still in a west-south-westerly direction. This changes to north-west in a mile and a-half, when the lake opens out, and the scenery becomes bolder than any we have met with since we left Lake Nipigon. This lake gives off long arms in various directions, and hills which I take to be three or four hundred feet in height above the level of the lake may be seen. The most extensive view of this lake obtained on the route followed by our guide, is in the neighbourhood of Wa-boose Island. About quarter to six we came to the outlet of the lake, our course having been south-westerly for the last two hours. We had barely entered the river (Michipicoten) when the first portage (Little Stony) occurs. It is on the right and only fifty yards in length. The fall which renders this portage necessary is about eight feet. From the time occupied, I estimate the distance from the Height of Land portage to Little Stony portage at about twenty miles.

I saw no good land on either Crooked or Dog Lakes; but have no doubt here and there limited areas may be found. Much of the timber has been destroyed by fire. Aspen, birch, tamarac, spruce and balsam are the most common. A few red pine are seen on Missinaibi, Crooked and Dog Lakes. White pine is met with on Crooked and also on this lake, but in small quantity only, so far as can be seen on the canoe route.

About two hundred yards below the last portage we arrived at what is called Big Stony portage, and as this is a mile in length we camped here for the night. The portage is on the left-hand side, as we descend the river.

September 9th.—Big Stony portage terminates at a lake called Manitoic, the bearing of which is between S.W. and W.S.W. It is, I should say nearly twelve miles in length, and in my opinion one of the prettiest lakes on the north shore. Where not burnt, there is a

fair sprinkling of white pine, with all the other trees usually met with on the lakes and rivers in the north. At the outlet, the river is two chains wide, and in two miles it brings us to Pigeon portage, one quarter of a mile long, with a descent in the rapid of about seven feet. This portage is also on the left hand side.

Immediately below this portage we enter Whitefish Lake. This lake is narrow, rarely exceeding eight or ten chains in width, but four or five miles in length. In this lake we met Mr. Carry returning from Michipicoten to the line on Dog Lake, and while conversing with him and renewing an acquaintance of some twenty years ago, Mr. Spencer came along on his return to Moose Factory. Mr. Spencer had had, like ourselves, a very tedious and disagreeable trip, and having left his wife and family at Michipicoten, there to await the arrival of a steamer, was now hurrying back with all speed to reach his post. He was good enough to take a small parcel and some letters I wished to send to Moose. After a short parley we said good-by, and departed each on his several way. We, continuing our course down the lake, entered the river and camped about two miles below the outlet. In this last stretch of river we ran a rapid, where frequently a portage called French Portage is made.

September 10th.—On the right hand, or north side of the river, where our camp was situated, there is a flat of gravelly soil, on which there is an Indian burial ground. Above this rises a bank, fifty or sixty feet in height, of gravel and sand with many rounded and water-worn stones. I took this for a drift deposit, and searched diligently for some evidence in the shape of Devonian or Silurian rocks to satisfy myself on that point; but although I have found pieces of fossiliferous limestone at every stage of my trip from James' Bay over the Height of Land to this point, I could see nothing in these rounded stones and pebbles that I could identify. They seemed to be made up of the material or rocks found on the Height of Land itself, such as are met with on Missinaibi, Crooked and Dog Lakes. As far as my experience goes, although the debris of the eroded palaeozoic rocks north of the Height of Land, even those on the coast of James' Bay can be found at short intervals from where they are "in situ" to the shore of Lake Superior, the proportion, or percentage, so to speak, becomes gradually less, as we advance southward until we reach the watershed. When we begin however, to descend the southern slope towards lakes Superior and Huron there is a sudden falling off and comparatively very few pieces of the fossiliferous limestone of the north can be found, and these most commonly small and often only the hardest and silicified pieces. A great erosion of the Huronian and Laurentian rocks on the Height of Land has occurred during the glacial epoch. That the immense quantity of material resulting from this erosion, should cause the limestones, sandstones and shales of James' Bay to form comparatively a very small proportion of the whole, and thus difficult to find, is therefore easily understood. But I think another cause that has contributed in no slight degree to this result is,—when these softer masses of Silurian and Devonian rocks came to be mixed with granite, and trap, and gneiss, torn from their beds on the Height of Land, and the whole promiscuous mass borne southward by some mysterious and irresistible power, as would then ensue in such a conflict of piece against piece and mass against mass, it is certain that the softer limestones and sandstones would be ground to powder and reduced to sand and clay and marl, few pieces of the original rock escaping and these only of the smallest and hardest. Pic River is the only exception I have met with, and there at the first fall and portage the limestone may be found in tolerable large pieces and in considerable quantity.

Started at 5.30 a.m. There was quite a sharp frost last night. Much hoar frost on the tents, grass and bushes. Ice nearly a quarter of an inch in thickness on water left in our tin cans. At 6.45 we came to Cat Portage on the left hand side, and one-third of a mile long. Crossing this and stopping for breakfast, it was nine o'clock when we again got under way. The river here forms a fine basin, nearly 300 yards in diameter immediately below this rapid.

Not quite a mile below the portage we pass high and precipitous cliffs, but, for the most part, covered with bushes and trees from bottom to top. The height is seemingly 250 feet, if not more. Two miles lower down we landed at the foot of a bank of drift-sand and gravel, with some stones, the whole about fifty feet in height and found, what appear to me, several pieces of limestone, and a piece of the holed or spotted dark quartzite, which I have

almost always found associated with the limestone. The land is sandy or gravelly, and seemingly light and poor. The scenery, however, is very pretty, the cliffs before referred to continuing for some distance. The river is shallow, and current rapid but not broken, there being few, if any, large stones or boulders in the bed or channel.

Two hours and a-half, in the course of which we must, I think, have made eight miles, brought us to a portage on the right a quarter of a mile in length, with an estimated fall of ten feet. Crossing this, in two miles or less we came to the Long Portage. This portage varies in length from one and a-half to two miles, according to the point in the rapids at the lower end, where it is possible to embark safely, and which is determined by the height of the water. The whole afternoon was occupied in getting our things across this portage, and we camped for the night at the lower end.

September 11th.—From the lower end of Long Portage to Michipicoten Post, the navigation is unbroken. The river is very crooked, with, at present, a strong but shallow current. It varies in width from two to four chains. High banks of sand, gravel and cobble stones bound it generally on one, but sometimes on both sides. The soil is too light to be arable, but near the mouth of the river, at the Hudson's Bay Company's Post, very fair hay and root crops are grown.

Two hours brisk paddling took us to the Post, the distance following the bends of the river being probably about eight miles. The Hudson's Bay Company's Post, I may observe, is situated about half a mile from Lake Superior.

Mr. Bell, the officer in charge of this district, was absent, but from Mrs. Bell and from Messrs. Vennor and Spence, we received a kindly welcome and all the attention it was in their power to bestow.

Contractors, with large numbers of men, had commenced making roads, to take in supplies for the construction of the O.P.R., at the crossing on Dog Lake, and a sudden and great change had come over this hitherto quiet and secluded spot.

Here we awaited the arrival of the mail steamer, *Manitoba*, until the 15th, when we embarked for Sault Ste. Marie and reached our destination next morning.

ESTIMATED DISTANCES between the principal points visited in the course of our explorations this season, with the number of portages, and total mileage.

ROUTE.	Number of Portages.	Distance in Miles.
From Red Rock to South Bay, Lake Nipigon	8	30
" S. Bay (Flat Rock Portage) to Nipigon House		35
" Nipigon House to mouth of Sturgeon River		32
" Mouth of Sturgeon R., L. Nipigon, to Long Lake House 23		93
" Long Lake House to Hon. Hudson's Bay Company's Post, Pic River	7	123
" H.B. Company's Post at Pic River to Long Lake House 18		123
" Long Lake House to English River Post	18	114
Excursions up Negaugaming and White Water Rivers....		75
From English River Post to the Junction of Kenogami and Albany Rivers		60
" Junction of Kenogami and Albany Rivers to Albany Factory, James' Bay		130
" Albany Factory to Moose Factory		100
" Moose Factory to Michipicoten, Lake Superior, via New Brunswick	30	350
By canoe.....	104	1265

LAND.

Only those who have lived in old and densely populated countries are in a position fully to realize the intense desire that may be felt by landless multitudes for even a few acres of bog, or the almost insuperable difficulty of acquiring land whereon to build even the humblest dwelling. Those who have been born and brought up in this New World, where there has hitherto been enough of land for all who wanted it, and so much over, cannot easily conceive that in a few generations such a state of things not only *may*, but in all human probability *will*, prevail on this continent also. The natural laws which have governed and insured the increase and multiplication of the human race from the beginning until now, if not absolutely inexorable, have not hitherto, at least, been amenable to any considerations of prudence or morality. Nor do the resulting calamities, sometimes called "positive checks," which have been so powerful in retarding the increase of populations elsewhere, bear heavily as yet on us. Not that wars, pestilences and famines are unknown even on this continent, but so far they have passed lightly over us and laid an apparently cruel hand only on the native races. In our case, too, another important factor must be taken into consideration, namely, the increasingly large immigration from most of the already over-peopled countries of the Old World.

I simply call attention to these facts to sustain me in the position which I take, namely, that the day is not nearly so remote as many imagine, when the pressure of increasing population will be such, that the poorest land on this continent, if capable only of growing grass and potatoes, and of affording abundance of good wood and water, will be anxiously and eagerly sought for.

Belgium affords a striking example of what an intelligent and industrious people can make of even the poorest soil, when urged on by the pressure of increasing population. I take the following from Mr. Mill's "Political Economy," and although brought forward by him to illustrate the advantage of peasant proprietors, it is equally good as affording an example of what land, which we should probably set down as utterly worthless, is capable of becoming. In Book II. chapter vi., s. 5, Mr. Mill wrote as follows :

"But the most decisive example in opposition to the English prejudice against cultivation by peasant proprietors is in the case of Belgium. *The soil is originally one of the worst in Europe.* 'The Provinces,' says Mr. McCulloch, 'of West and East Flanders, and Hainault, form a far-stretching plain of which the luxuriant vegetation indicates the indefatigable care and labour bestowed upon its cultivation; for the natural soil consists almost wholly of barren sand, and its great fertility is entirely the result of very skilful management and judicious application of various manures.'" And again a little further on Mr. Mill, quoting from a book on Flemish Husbandry, says: "that the Flemish agriculturists *seem to want nothing but space to work upon*; whatever be the quality or texture of the soil, in time they will make it produce something. The sand in the Campine can be compared to nothing but the sands on the sea shore, which they probably were originally." After describing step by step the process of improvement, the writer concludes with the following: "After the land has been gradually brought into a good state, and is cultivated in a regular manner, there appears much less difference between the soils which have been originally good and those which have been made so by labour and industry. At least the crops in both appear more nearly alike at harvest, than is the case in soils of different qualities in other countries." Finally, near the end of this chapter, Mr. Mill, quoting from Arthur Young, a celebrated English agriculturist, says: "I know no way so sure of carrying tillage to a mountain top as by permitting the adjoining villagers to acquire it in property; *in fact we see that in the mountains in Languedoc they have conveyed earth in baskets on their backs to form a soil where nature had denied it.*"

Again of the Engadine, a valley in the High Alps, Mr. H. D. Inglis, in his work on Switzerland, writes as follows: "There is not a foot of waste land in the Engadine, the lowest part of which is not much lower than the top of Snowden. Wherever grass will grow, there it is; wherever a rock will bear a blade, verdure is seen upon it; wherever an ear of rye will ripen, there it is to be found. Barley and oats have also their appro-

priate spots ; and wherever it is possible to ripen a little patch of wheat, the cultivation of it is attempted."

North of the watershed between our great lakes and James' Bay, Ontario is, under the award, entitled to some 40,000,000 acres of land. This vast wilderness includes numerous lakes, much swamp, and enormous tracts covered with peat-mosses, called muskegs by the natives. The proportion of bare rock is very small. With the exception of limited areas on the coast and rivers, the whole of the territory from James' Bay southward for nearly 150 miles is covered with peat-mosses, swamps, marshes and shallow lakes. The soil thus buried is a clay-marl, and is sufficiently high above the rivers to admit of the drainage and reclamation of much the greater portion of it. This will be probably the work of the second or third generation from now. On the watershed again there is another but much narrower belt. This is much broken, being made up of numerous lakes and ponds, with marshes, small muskegs and swamps, divided by low, rocky, gravelly and sandy ridges—the latter sometimes full of boulders. This is the character of the country at or about the watershed. On either side of that, but more generally on the north, tracts of poor, sandy land are frequently met with. This belt varies greatly in width, being in some places only a few miles and in others as much as fifty or sixty miles. Intermediate between this last and the "Muskego" region is a belt of better land—a belt which may be called, by comparison at least, "a fertile belt," and suitable, if opened up, for earlier settlement.

I had previously entertained the opinion that there was such a belt of better land, and I am glad to say that the explorations of the past season, although by no means conclusive as to its extent, confirm my belief in its existence. I have now crossed it on six different lines, viz., on the Abittibi, Mattagami, Ahkuckootish, Missinaibi, Kenogami and Albany Rivers. But when we consider that the distance between these extreme points is upwards of 400 miles, it would be folly to assert positively that this fertile belt is continuous throughout, or pretend definitely to lay down its boundaries. To the best of my judgment, however, the northern boundary of this belt, or the dividing line between it and the Muskego country, is but a little way north of Lake Abittibi on our eastern boundary. From thence, going westward, I should fix on or about the junction of Frederick River and the Abittibe River as the next point. On the Mattagami or south branch of the Moose, Sturgeon Falls may be said to be about the place where the muskegs fairly begin. On the Ahkuckootish or Ground-hog River, the change takes place about the lower end of Long Rapids, forty-eight miles or so north of Flying Post. The dividing line from thence would appear to take a course north of west, crossing the Missinaibi or north branch of the Moose, as nearly as I can guess (for it is little more than that) about twenty miles below the junction of Brunswick River. Still keeping a west north-westerly course I think it then crosses the Kenogami River about ten miles below the last or eighteenth portage.

From this point I cannot say with any degree of confidence what course the dividing line, as between the muskegs on the north, and this drier and more fertile belt on the south, really takes, but that the belt itself still extends a long way west of the Kenogami River I have little doubt. I am inclined to think that it will be found to strike the Albany about Lake Miminiska.

The southern boundary of this fertile belt is equally irregular, approaching at some points almost to the water-shed, and at others retiring to a distance of not less than forty or fifty miles north of it. It is bounded in this direction, of course, by the poor broken and swampy or sandy belt already alluded to as usually met with for some distance on both sides of the water-shed. Indeed, it is not likely that there is any well-marked line of demarcation between these two belts, but a gradual transition from one to the other.

Now, although I call this "the fertile belt" of this northern territory for the sake of distinction, I must not be understood to mean that all the land, or indeed, more than a small part of it, needs only to be broken up in order to produce grain. As in the Muskeg country to the north there are numerous tracts of arable land, so in this fertile belt may still be found many areas of muskeg and swamp, as well as much land that is unarable on account of its lightness or the stony nature of the soil.

If, as I hope, this tract of drier and more fertile land shall be found to extend across the territory from the eastern to the western boundary, it will be not less than 400 miles

in length, and assuming the breadth to be on an average fifty miles (as I believe it is), we have in this belt not less than twenty thousand square miles, or twelve million eight hundred thousand acres of land.

Making every reasonable deduction for lakes, marshes, swamps, muskegs, and unarable land, a very large quantity will still remain, more or less fit for settlement. While there are smaller areas on which grain and root crops may be successfully cultivated, the far greater part of this fertile belt is, in my opinion, chiefly if not solely valuable for the excellent pasture it is capable of affording. Both the climate and the soil are favourable to a mixed system of husbandry; but stock-raising and dairy-farming will be, I am persuaded, the most successful and productive branches.

One very marked natural feature which distinguishes this fertile belt from the Muskeg country lying to the north of it, is the general prevalence of timber or forests in the one, and the equally marked absence of forests, properly speaking, in the other. Of course, fires have stripped large areas in the fertile belt of its timber, and in the flat Muskeg country good trees may be found near the rivers and on alluvial islands, but this does not affect the general rule.

The Hudson Bay Company's Posts, at Abittibi, Flying Post, New Brunswick and Long Lake, are all situated within this belt. Mattawagamingue lies a little to the south of it. It is only at these Posts that any attempt has been made to cultivate the soil, and even there the agricultural operations have been of a very limited and, I may say, primitive nature. Such information as I have been able to obtain in regard to the crops has been given in previous reports. I shall only repeat here that wheat, oats, barley, beans, peas, potatoes, turnips, carrots, parsnips, onions, cabbages, and cauliflowers, etc., have all been successfully grown at one or other of these Posts; that small fruits, such as raspberries, red currants and strawberries yield abundantly, and that both the soil and climate are particularly favourable to the growth of timothy, of clover, and doubtless of many other important grasses, the seed of which has not yet been introduced into the territory.

The cattle kept at the Posts in this fertile belt prove by their size, condition and general healthiness, the admirable fitness of the country for the raising and keeping of stock. More detailed information in reference to the climate and productions of this territory will be found in my first Report, 1879-80, to which I must respectfully refer.

I have only further to observe under this head that not only is the climate salubrious, and the soil reasonably fertile, but that the whole of this belt is exceedingly well-watered, and will afford the settler an ample supply of wood for fuel, fencing, and other necessary purposes. At the same time the land is not generally so heavily timbered, as to render clearing unusually laborious and expensive.

But with this, I wish it to be understood that even the so-called fertile land in this belt must be properly cultivated and cared for from the beginning. Those who expect to raise root and grain crops or even cultivated grasses without manure or the least regard to rotation of crops, or drainage, are not fitted for this country and had better go elsewhere. What this territory requires is farmers—*bona fide* farmers—men whose aim is rather to improve and increase the fertility of the soil than to impoverish and exhaust it. Those who simply rob the soil of its fertility and then leave it, or devolve on others the labour and expense of restoring it, are neither good farmers nor desirable citizens.

MINERALS.

The existence of beds of lignite coal, of iron ore, of gypsum and kaolin, and of veins containing copper and lead ores in this Disputed Territory has been mentioned in former reports.

While our explorations this season have not been very prolific in respect of the discovery of new minerals, they have not been altogether barren of results.

The finding of Magnetic iron ore of good quality *in situ* on Little-Long Lake may turn out to be of some economic importance. It is true that where found by us it is under the level of the water, but I am persuaded that had circumstances permitted us to

make a more prolonged and careful search, we should probably have succeeded in discovering bodies of this ore in the vicinity, more favourably situated for working. Nor is it at all improbable that the water of this lake may be drained or lowered at a very moderate expense, so as to allow of the ore being worked where we have already discovered it. The geological formation is such as renders the occurrence of rich iron ores by no means unlikely, and the locality is not so remote or inaccessible as to forbid all hope of their being profitably worked, should they be found in sufficient quantity.

I have been able this season also to re-examine, under more favourable circumstances, the deposit of kaolin, or china-clay, discovered by me in 1880, on the Missinaibi River. I am glad to say that this clay exists there in very large, probably inexhaustible quantity. It is situated about six miles below Coal Brook, or Creek, and on the same (east) side of the river. The bed of clay, as seen in the bank when the water is low, would appear to be at least ten or twelve feet in thickness. Below it and above it are strata of beautiful white sand. The upper stratum of sand is of singular purity and upwards of twenty feet in thickness. The lower is somewhat coarser grained and has a slightly yellowish tint. The china-clay and these sands are distinctly traceable for half a mile, in length. The attitude of these beds appears to be nearly horizontal. The kaolin, as it appears in the bank, is in patches, some of which are white and others red. The red is impure, that colour being due to the presence of iron. I am inclined to think that its presence is altogether accidental, and confined to the out-crop. The great bulk of the clay will, I believe, be found to be a pure white china-clay, whenever the bed is properly uncovered and worked. Samples of this clay, examined by the late Professor Croft, were pronounced by him equal to English china-clay. Another sample, examined by Mr. Hoffman, of the Geological Survey, contained enough of iron to discolour it, and impair its value as a material for the manufacture of fine china. Both specimens were taken from the out-crop of the bed, and absolute purity from foreign matter could not be expected under such circumstances.

Should this clay prove, as I believe it will prove, suitable for the manufacture of china, associated as it is with the finest of sand for glass-making, and with beds of lignite coal and peat, this can hardly fail, I think, to be a point where manufactures of pottery and of glass will ultimately be established.

The existence of limestone, either *in situ* or in pieces, in the gravels and soils of this territory is of more than mere speculative interest. The sterility of soils which repose on granite, gneiss, and the older metamorphic and schistose rocks is not unfrequently owing to a deficiency of lime. The close attention I have given to this point, and the numerous references in my narrative to the presence of fossiliferous limestone, as well as of marls, in the surface soils is therefore of practical importance and value. It proves that in all this territory the areas, if any, must be very limited in the soil of which there is any deficiency of lime. On the contrary, it establishes the fact, that even where limestone does not exist "in place" as one of the rocks, calcareous matter is everywhere abundantly present in the soils or sub-soils, or both.

FISH.

The plateau which forms the Height of Land and extends many miles both north and south of the actual watershed, is a perfect network of lakes. The most considerable of these are Lake Nipigon, lying a short distance south, and Long Lake immediately north of the watershed. There are, however, hundreds of other lakes varying in size from fifty acres to fifty square miles. Nor are they confined to the Height of Land plateau between Lakes Huron and Superior, and James' Bay, for they are nearly, if not quite, as numerous west of Lake Superior, and in some parts of the country lying between the Georgian Bay and Ottawa Valley. In addition to those lakes which lie entirely within our Province, there are other lakes situated on the boundaries, and which are partly so. Such lakes for instance as Abitibi on our eastern boundary, and Rainy Lake, Lake of the Woods, Lac Seul or Lonely Lake, and Lake St. Joseph, on our southern and western boundaries.

These again are exclusive, entirely, of what we call our "great lakes," Superior, Huron, Erie and Ontario, one half of which, or more, properly belongs to the Province of Ontario. What may be the total area of the *submerged land*, or in other words, lakes included within the boundaries of the Province of Ontario, no one in the present state of our knowledge of the country can truly estimate. Of the great lakes alone, probably not less than 30,000 square miles are in Ontario. Assuming the area of all the other lakes in the Province (inclusive of the disputed territory), to be 20,000 square miles, and I am persuaded it is not less, we have 50,000 square miles of submerged land. Much of this will in the future be drained, and millions of acres of land reclaimed. More of it must remain forever covered with water and may be utilized partly for the purposes of navigation, and partly as affording wholesome food in the form of fish.

The great number of lakes, and the vast area, embraced within the limits of this Province, has been already adverted to. The people who assume these lakes to be valueless from a Provincial point of view, fall into the same error as those who contend that the land, minerals, timber and other resources of this territory are worthless; they take it for granted that the world is going to stand still! Mine is a different faith, I believe that this territory, hitherto so inaccessible, is on the eve of being opened up, and all its various resources developed. Now as regards fish, the larger lakes, more particularly Lake Nipigon, are capable of affording employment to many fishermen, and of yielding, at least for a time, considerable quantities of excellent fish without any particular care or attention. But in the future, when the art of fish-breeding and raising shall be as well understood and as systematically practised as cattle-breeding or the raising of poultry, I think the smaller lakes will be more valuable, and produce more fish in proportion to their area, than the larger ones. They will be much more manageable, so to speak, and thus afford a better opportunity for the exercise of the knowledge and skill which mankind have acquired, or may hereafter acquire, bearing on the successful practice of what is called "pisciculture" or fish culture. Left simply to the operation of natural laws, our lakes and rivers contain fish and "fishes," if I may be pardoned for using such an expression. By fish, I mean those kinds which obtain their nourishment from sources which *directly* contribute little or nothing toward the sustenance of man. For example, all those varieties of fish which feed upon insects, or the larvae of insects, worms, snails, grubs, caterpillars, grasshoppers—upon mollusca or shellfish, or crawfish, and even on minnows, or other small fish, which however numerous, would be of little or no importance as food for man. I include under this head also all those kinds of fish, if there be such, as are vegetarians or herbivorous, drawing their subsistence, in whole or in part, from the grasses and plants growing on the submerged land or in the water itself.

By "fishes" I would be understood to mean predatory or carnivorous fishes, which live by devouring, for the most part, the other kinds of fish referred to above, namely, those which, while themselves good for food, consume nothing which man himself could or would eat.

Now, without having made a study of the subject, it appears to me that the aim of the fish-culturist should be to keep such kinds of fish, and such numbers of fish as will utilize all the fish food afforded by his pond or lake, preferring of course those kinds which will yield the largest return, in respect of quantity and quality of human food. On the other hand the predatory fishes, such as the pike should, it seems to me, *be entirely banished or excluded from the pond or lake, if possible*. The result of allowing such fishes to remain being, that although they may in due time themselves become the food of man, they will probably have consumed more than twenty times their weight of better fish, which but for them might also have become human food. This would be anything but true economy. We know pretty well how many pounds of corn it takes to make a pound of pork, or a pound of beef; but we are entirely in the dark, at least I am, as to how many pounds of herring or white fish are required to make a pound of pike—of dore or pickerel—or even of lake-trout. It is difficult to form even a conjecture on the subject, but I am inclined to think that in putting it at twenty times their own weight, I am very much below the truth. If this be so, those smaller lakes in respect of which an intelligent system of pisciculture can be adopted, will, as I have said, be more valuable and productive in proportion to their area, than the larger lakes. Fish-breeding can be

carried on in the smaller lakes by private individuals. If favourably situated as regards drainage, inferior kinds of fish, such as the sucker, and the predatory fishes, such as the pike, can be weeded out, and only those which are in every respect desirable retained; or foreign stock might be imported and introduced, in some cases, with decided advantage. In the large lakes, where it is practically impossible to do this, there can be no scientific pisciculture in the proper sense of the term. Still much can be done to increase the produce even of the largest, by wise fishery laws or regulations; the object of which should be to aid and encourage the multiplication and increase of such fish as the whitefish, and to reduce as much as possible the numbers of the predatory fishes, of which the pike may be taken as a type.

The inadequacy (as it humbly appears to me) of our fishery laws may be inferred from the simple fact that not only the pike, but every other kind of predatory fish is actually protected, while the sturgeon, one of the most valuable of fresh-water fish, is, I believe, altogether unprotected.

The following extracts are taken from an interesting article on "Pisciculture," in Chambers's Encyclopedia:

"The Chinese have long bestowed more attention on pisciculture than any other nation, and with them it is truly a branch of economy, tending to the increase of the supply of food, and of the national wealth. * * * In some countries of modern Europe this branch of pisciculture is also prosecuted to a very considerable extent, particularly in Germany and Sweden, and of late years in France in order to the supply of fish for the market. In Britain it has never been systematically prosecuted. * * * In Germany, ponds carefully attended to, are found very productive and remunerative. There can be no doubt that in Britain, also, many a piece of land, at present very worthless, might easily be converted into a pond and be made to yield large quantities of excellent fish; but such a thing seems almost never to be thought of. * * * Modern pisciculture is the revival of an old art, well known to the ancient Italians, but which had fallen into abeyance for a number of centuries. The art of breeding and fattening fish was well known to the luxurious Romans. * * * The art had doubtless been borrowed from the ingenious Chinese, who are understood to have practised the art of collecting fish-eggs and nursing young fish from a very early period. Fish forms to the Chinese a most important article of diet, and from the extent of the water territory of China, and the quantities that can be cultivated, *it is very cheap.*" * * * After an interesting account of fish-hatching as pursued at Huningue, in France, the writer goes on to say: "The art of pisciculture has also been introduced into Ireland, at the fisheries of Loughs Mask and Carra by the Messrs. Ashworth, who have obtained excellent practical results from their enterprise. These loughs contain an area of water equal to *thirty-five acres*, and a communication with the sea having been opened, they now teem with salmon; and the proprietors are confident that *it is as easy and as profitable to cultivate salmon as sheep.*" This article concludes as follows: "There is no practical difficulty, it is said, in rendering an acre of water as productive as an acre of land."

If this be so now, or if as our knowledge of the art of fish-culture increases, there be the remotest probability of "an acre of water being rendered anything like as productive as an acre of land," how important and valuable must the 20,000 square miles or 12,800,000 acres of water (exclusive of the great lakes) included in the Province of Ontario be! How proper that every precaution should be taken to maintain the right of the people of the Province thereto as against all claimants.

OPENING UP THE COUNTRY.

In my first report (p. 40) I dwelt at some length on this subject. Although I have barely touched upon it since, it has never been absent from my mind in all my explorations and journeys. The refusal of the Federal Government to regard the award of the arbitrators, and the uncertainty which has hitherto prevailed as to the route which might be finally adopted for the Canadian Pacific Railway, seemed to me to render any further suggestions premature, if not absolutely useless.

The Lake Superior section of the railway has now been for the most part located. I feel, therefore, in a better position to give an opinion as to what may be the proper mode of opening up the territory claimed by Ontario north of the Height of Land.

As the railway will not cross the watershed north of Lake Superior, the territory cannot be opened up to settlement without roads, the expense of making which must necessarily be borne by the Province. Of two or more plans therefore equally eligible in other respects, the one which is calculated to secure to the people of our own Province the largest share of the trade of this northern territory and of Hudson's Bay, should obviously be preferred.

Bearing this in mind and having due regard to efficiency and economy, the conclusion I have arrived at is, that in the absence of direct railway communication, which is not likely to be available for many years, the best route to the fertile belt I have described in this report, as well as to James' Bay, is by Long Lake.

The following appears to me the best plan to develop the resources of the country, and bid for a share in the trade of Hudson's Bay. My plan would be as follows: 1st. To make a road from Jackfish Bay, on Lake Superior, to Long Lake—22 miles. 2nd. To place a steam tug on Long Lake. 3rd. To make a road on the south-east side of the Kenogami River, commencing at the first rapid and portage below Long Lake, and terminating at the last or eighteenth portage—45 miles. 4th. To place another steam tug at the lower end of this eighteenth portage.

This is absolutely all that is necessary to open up a good route to the fertile belt north of Long Lake, which would be available the whole summer, and a good route also to and from James' Bay for the shorter period of, say six weeks. The total length of waggon road required is not more than sixty-seven miles. If the Government sees fit to make the road, private enterprise will soon supply all else that may be needed to complete the communication.

The distance by this route from Lake Superior to James' Bay will be about as follows:

	Miles.
From Jackfish Bay, Lake Superior, to Long Lake.....	22 road
" South end of Long Lake to first portage on Kenogami River (unbroken steam navigation).....	58
" First portage to eighteenth portage on Kenogami River..	45 road
" Eighteenth portage on the Kenogami to Albany Factory James' Bay (unbroken steam navigation for six weeks in the spring).....	250
In all.....	375 miles.

The time required to make the trip from Lake Superior to James' Bay by this route, reckoning the speed to average six miles an hour on the road, and eight miles an hour on the lake and river, would be forty-nine and a-half hours, or in round numbers, two days only. The return trip would occupy a longer time, owing to the strength of the currents in the Albany and the upper stretch of the Kenogami River. Four or five days, however, should be amply sufficient even for the return trip.

Now, let us see, what may be the cost of the transportation of heavy freight, such as flour and pork, over this route. Assuming that there would be settlers on the roads glad to obtain occasional employment for themselves and teams, the hauling of pork and flour sixty-seven miles on a reasonably good road should not, under any circumstances, cost more than \$10 per ton. Nor should the freight by steamers on Long Lake and the Kenogami and Albany Rivers, 308 miles with only one break, exceed another \$10 per ton. If these rates be sufficient, and I am persuaded that they are ample, the transportation of provisions or heavy goods from Lake Superior to Albany Factory, on James' Bay, by this route need not exceed \$20 per ton, and less, of course, to intermediate points. With back-freights from Hudson's Bay to Lake Superior, and steady employment, the cost of transport might be very greatly reduced.

As stated in my Report for 1879-80, p. 41, "the cost of transporting goods from Toronto or Hamilton to Moose Factory (by canoes), either via Temiscamingue and the

Upper Ottawa, or by Michipicoten and Moose River, would not probably be less than \$150 to \$200 per ton." The only alternative which at that time suggested itself to my mind was the ocean route, via Hudson's Straits. This may be, and indeed is, of vital importance, so far as the direct trade between that portion of our territory bordering on James' Bay and the Mother Country, is concerned. But, as a means of communication between the populous and older settled parts of our own Province and this territory, I am decidedly of opinion that pending the construction of a railway direct from Lakes Huron or Superior to James' Bay, the route by Long Lake is, in some most important respects, much the best.

Among other advantages offered by this route the following may be specified, namely :

1st. The smallness of the outlay required, and the shortness of the time needed, for the completion of this route.

2nd. The length and superiority of the water stretches as compared with those on any other route.

3rd. The shortness of the roads required to complete the communication from Lake Superior to Hudson's Bay, as compared with any other route.

4th. The cheapness of transport resulting from the shortness of the land-carriage, and the favourable nature of the navigation afforded by Long Lake, the Kenogami or English River, and the Albany River.

5th. It will be the means of opening up a country, hitherto shrouded in a very considerable degree of darkness, and enable us to obtain full and reliable information in reference to its people and its resources.

6th. It will be the first step towards the inauguration of a direct trade between the merchants and manufacturers of Ontario and Hudson's Bay.

7th. It will confer a boon on the natives and others of this vast territory, the importance and value of which it is impossible to exaggerate. Among other blessings that may be confidently looked for will be a much greater abundance and cheapness of the necessities of life, of food more particularly.

Thus much for the advantages of this route as a means of communication between Lake Superior and James' Bay. But there are other benefits which will be obtained by and from it, as regards the intermediate territory, namely :

1st. It will open up to settlement the fertile belt north of Long Lake, and the richer but more limited tracts of alluvial land on the Kenogami River and its tributaries.

2nd. It will develop and make available the mineral and timber resources of an extensive country around Long Lake, Little-Long Lake, and Manitounamaig.

3rd. The termini of this route are so situated as to afford settlers and others in the country it passes through, *alternative and competitive modes of transport*. The cattle, horses, butter, and cheese, which will, in all probability, be the chief agricultural products of the territory, may, when they reach Jackfish Bay, be sent eastward either by rail or water. Or before long perhaps these products for which the teeming population of the Mother Country affords such an excellent market, might be transported over this route to James' Bay, and thence shipped direct to England. It is, of course, to be regretted that from the eighteenth portage on the Kenogami River to James' Bay, navigation by steam-boats is only possible in the spring and early summer, when the water is always high and of sufficient depth to float such steamers as ply on the Upper Mississippi and Missouri Rivers. It is probable that in some seasons the Albany and Kenogami may also admit of a short period of navigation after the autumn rains, which are sometimes very heavy. But even supposing the period of navigation shorter than I believe it to be, this route will still be of inestimable value as a means of communication, until the resources and trade of Hudson's Bay and the intermediate territory are so far developed as to warrant the construction of railways.

Another point at which this fertile belt of country may be easily tapped, and an intermediate section of our Province, of great extent and large possibilities, at the same time opened up and developed, is at Red Rock, Nipigon Bay. Here, also, the settlers will have the choice of two different modes of conveyance, either steamboat or railway. A waggon road, twenty-five miles in length, built from this point to South Bay, Lake Nipigon, would at once open up to settlement very large tracts of land, lying to the

north and west of the lake. Lake Nipigon is a much larger lake than Lake Nipissing, measuring as it does, according to Dr. Bell's survey, seventy miles in length and fifty miles in breadth, with a coast line of more than 580 miles. My route was through a part of the lake where little good land is to be seen, and I was, as I have said, somewhat disappointed with what I saw of it. But, in 1881, I noticed a fertile belt of land to the south of Lac Seul or Lonely Lake. At first it appeared in irregular patches, but in the vicinity of Lake Wabigoon it became more general. It struck me at that time as probable that this belt might extend eastward for some considerable distance in the direction of Lake Nipigon. Now, Dr. Bell says (Report of Progress of 1869) : "In the Nipigon country the largest tract of good land appears to lie on the south-western side of the lake. From the Nonwatan River northward to the Pajitchigama, a distance of fifty miles, the country is comparatively level, and soil generally fertile; but we could not ascertain from our own explorations how far westward this tract extends. *The Indians and others, however, represent it as continuing nearly to the Winnipeg River*, and becoming more generally level in receding from Lake Nipigon." I cannot, therefore, help thinking that there may be some foundation for this statement of the Indians, and that possibly, if not probably, there will be found to be a very large area of moderately fertile land situated to the westward of Lake Nipigon and extending to Lake Wabigoon, nearly 150 miles distant. Dr. Bell has mentioned a number of other localities where he met^s with good land on this lake, and among others Windigo's Bay, at the north-western and Ombabika Bay at the north-eastern extremity of the lake. Of the former he says : "From Kawabatongwa River to the Pickitigouching, the country is low near the lake, and a level tract extends northward to an unknown distance from Windigo's Bay. It is believed that in this direction a large area is overspread with light-coloured clay." And of the latter Dr. Bell says : "It has been already mentioned that the country is level, and the soil good, all along the north-east side of Ombabika Bay, and at least as far back from it, in a north-easterly direction, as the eye can reach." Now, as the water-shed is but a short distance north of Lake Nipigon, it is probable that this tract of good land, described by Dr. Bell as extending in a northerly and north-easterly direction, an unknown distance from Wendigo's and Ombabika Bays, may be almost, if not quite, continuous with the "fertile belt," north of the watershed, and supposed to extend almost unbroken from the Abitibi to the Albany River. If so, the construction of this road from Red Rock to South Bay is the first grand step toward the opening up and development, not only of Lake Nipigon, with its varied and promising resources, but of the fertile belt in the territory immediately beyond the Height of Land.

As a route to James' Bay, this cannot compare, in my opinion, with that by Long Lake, the Upper Albany being far from navigable in any reasonable sense of the term. But this road will let daylight into this part of the country also, and with it explorers, lumbermen, fishermen, and travellers by scores, who will soon discover and make its resources generally known, thus promoting the speedy development and the settlement of what may prove a most important and valuable section of this Province. I feel safe in saying that the cost of this road would be returned many fold to the Treasury within a very few years after it is completed. Although I do not think there is much, if any, white or red pine on the east side of Lake Nipigon, I should not be at all surprised if this valuable timber were found growing, even in considerable quantity, at no great distance to the westward. And undoubtedly there must be a great deal of timber, suitable for railway ties, telegraph poles, and such like, the timber dues on which will go to swell the revenues of the Province.

As soon as the Lake Superior section of the Canadian Pacific Railway is completed, the fertile belt lying east and west of the Missinaibi River, including the Hudson Bay Company's Post, at New Brunswick, can be opened up for settlement by improving the water-ways and constructing roads to communicate with the railway at Dog Lake and other suitable points. In the meantime, however, I think it may be advisable to postpone other work, having this object in view, until the Long Lake route is completed. I may state, however, for the information of the Government, when the time to open up and develop this part also of our territory shall have arrived, that from the point where the C.P.R. crosses Dog Lake to the first portage on the Missinaibi River, a distance of

about forty miles, there is very good water navigation, broken only by two short portages. The first is between Dog Lake and Crooked Lake, and not more than 200 yards in length. The second is between Crooked Lake and Lake Missinaibi, and about 350 yards in length. These lakes are so nearly on a level, and the distance between them is so short, that the navigation might be made continuous, in my opinion, at a very trifling expense. Thus when the railway is finished the territory should be easily and cheaply accessible to a point nearly 100 miles from Michipicoten, on Lake Superior. A road from the first portage on the Missinaibi, some thirty miles in length, would reach New Brunswick Lake and tap the northern fertile belt at this point also. Should the C.P.R., between Sudbury Junction and Dog Lake, touch Lake Winnibeegon, the principal source of Mississagua River, the fertile belt can again be judiciously "tapped" by a road extending northward. This section of the railway, however, has not, so far as known to me, been yet located. The Abitibi district can, I think, be most cheaply and efficiently opened up by way of Lake Temiscamingue. But as Lake Temiscamingue itself is not as yet reached by rail, it is needless to say more on this subject at present.

Under this head I may be expected to say something in reference to the navigation of the Hudson's Bay, in which so deep an interest is felt by many persons in this Province, as well as in the North-West. My own explorations, however, having extended no farther north than Charlton Island, nor along the coast more than about 100 miles east and west of Moose Factory, I have really had but a poor opportunity of forming opinions from my own observations. This is a subject, too, on which the Hudson Bay Company's officers are more than usually reticent, influenced, as they probably are, by the fear that the opening up of the country will be injurious to the interests of the company, if not also to their own. I have, therefore, neither asked nor obtained much information from them.

While I am of opinion that James' Bay, owing partly to its shallowness, freezes in all probability entirely over in the winter, I do not think that the main Hudson's Bay freezes or continues frozen for any length of time. It may do so in sheltered bays and in the channel between the east main coast and the chain of islands, which for a great distance runs parallel to it; and there may be, also, in many places, a wide belt of shore-ice of great thickness, but I am decidedly of opinion that the main body of the bay remains open all winter.

When in spring the ice breaks up on James' Bay, it is doubtless the central field that moves out into the main Hudson's Bay first, and there this field-ice will be soon broken up into pieces by the action of the swell and waves. The ice although thus broken up continues, in all probability, both heavy enough and hard enough to impede, if not entirely stop, the progress of sailing vessels, wherever it may be met with between James' Bay and the Straits. The shore-ice and that of the smaller and more sheltered bays will not probably break up and leave for a week or two after the other, much depending on the weather and the height of the tides, as well as the direction of the wind. This ice when met with, if at all "closely packed," would, I suspect, even more effectually obstruct the progress of a sailing ship or a side-wheel steamer, than even the thinner field-ice. Indeed, ice of very moderate thickness, such as forms on the sheltered bays around Lake Superior or Lake Huron, when broken into pieces and thoroughly packed, will sometimes offer such resistance that it is impossible for even a powerful propellor to force its way through it.

How much, if any, of the ice which forms in James' Bay finds its way to Hudson's Straits, and thence into the Atlantic ocean, I am quite unable to say. I have every reason to believe, however, that it is frequently to be met with in the month of August in the middle of Hudson's Bay, and sometimes hardly outside of James' Bay; and that even as late as the 15th of August the pack is strong enough to stop the progress of the Hudson's Bay Company's ships and imprison them for days, if not weeks. I am inclined, therefore, to think that although a portion of the ice formed during the winter on James' Bay may find its way through Hudson's Straits, the greater part of it floats about in Hudson's Bay itself until melted, as the last of it probably would be in the month of September. Of the ice which is poured into the upper end of Hudson's Bay and Straits from Foxes Channel, I know nothing.

When the limited area of James' and other bays on which ice forms in the winter is compared with that of Hudson's Bay itself, which is believed to remain always open, it is certain that the floating ice produced by the former can cover only a fraction of Hudson's Bay during even the earlier months of the summer. If this ice *be all*, propellers, even if unable to work their way through the packs or fields, could, I imagine, generally, if not always, get round them and proceed on their voyage with (as compared with sailing-vessels) very little detention or delay. The necessity of building vessels specially for this trade, and for this trade alone, is the most plausible objection that can be brought against the successful navigation of Hudson's Bay and Straits in a mercantile point of view. The shipowner says the vessels for this route must be steamships necessarily using large quantities of coal, which, if there be no coal suitable for the purpose on Hudson's Bay, would entail the necessity of taking with them sufficient coal to bring them back. He further says that in order to be safe these vessels must be built like whaling and sealing ships, of great thickness and strength, and therefore of great weight. That the consequence would be a great reduction of the carrying capacity, necessitating the charging of much higher freights on the cargo they could really take. Again it is said that these vessels, from their weight and deficient carrying capacity, could not be employed on any other route, as they would be unable to compete with ordinary sea-going steamers. And, finally, as the Hudson's Bay and Straits can only be navigated at all for some four months in the year, these vessels would be entirely unemployed and idle for the other eight months, during which they would be yielding no return whatever on the capital invested. This would still further enhance the rates of freight that it would be necessary to charge, and consequently the whole thing would be a failure in a mercantile point of view. My own impression is that the fleet of vessels engaged in the seal-fishery during the earlier part of the season might be advantageously employed during the summer in transporting grain and other produce from the ports on the Hudson's Bay to some port or point outside the Straits that could be safely approached and entered by ordinary sea-going ships and steamers. Here, of course, a transhipment would be necessary. If sealing vessels, however, would answer for this trade, their employment during a season when *they* would otherwise be doing nothing should enable the owners to carry produce at a rate of freight so moderate as to much more than make up for the cost of this transhipment.

But even if a class of vessels specially fitted for the navigation of Hudson's Bay and Straits had to be built, it may lessen, no doubt, the advantages the route otherwise possesses, but it by no means follows that it counterbalances them. While it would be proper to build vessels of sufficient strength to preserve them from being injured by the ice, my opinion is that they should consist of steam barges and sailing consorts, worked on the same plan as those employed in the grain trade on our great lakes. It would still be desirable to tranship produce intended for Europe. By so doing the vessels specially adapted for the navigation of Hudson's Bay and Straits would be kept there the whole season, while ordinary vessels and steamers would make the Atlantic part of the voyage, for which they are specially fitted. It is not improbable that before the navigation of Hudson's Bay and Straits opened in the spring, and again after it had closed in the fall, such a class of vessels as those in question might be advantageously placed on the route between Quebec and the Maritime Provinces, transporting flour and other produce one way and coal the other. I see no reason why vessels of such strength should not be able to make several trips in the fall after the navigation of the St. Lawrence was practically closed, so far as ordinary ships and steamers were concerned. Nor is it unlikely that one such voyage could be made in the spring. On the whole, it appears to me that these vessels may be kept employed as long, if not longer, than those engaged in the grain trade on our great lakes, and the argument that such vessels must be laid up in the winter and, therefore, unproductive, is just as strong in one case as in the other.

It is sincerely to be hoped that the Dominion Government will waken up to the importance of having a survey and correct charts made of Hudson's Bay, otherwise the navigation, however practicable and safe, will be rendered unnecessarily dangerous.

STATE OF RELIGION.

I have, this season, had the pleasure of meeting, for the first time, the Right Reverend Dr. Horden, Bishop of Moosonee, who, at my request, furnished me with the following interesting information in reference to the history and present state of the Missions in the Diocese :

The Moose mission was commenced by the Wesleyans about the year 1838, who sent to Moose Factory the Rev. G. Barnley, who laboured nine years at Moose and elsewhere in the country very indefatigably, meeting with considerable success and baptizing a large number, both of Indians and half-castes ; he then returned to England and for four years the mission was unoccupied. But, Mrs. Miles, wife of the gentleman then in charge of Moose Factory, a woman of great influence among the natives, and a sincere Christian, exerted herself in a most praise-worthy manner to keep the Indians in remembrance of the faith they had embraced, constantly exhorting them and organizing prayer-meetings among them. The Wesleyans, then in considerable difficulties and unable to send a successor to Mr. Barnley, invited the Church Missionary Society to take up the work; this they did, and in 1851 Mr. and Mrs. Horden were sent to Moose under their auspices ; in 1852 the mission was visited by Dr. Anderson, the first bishop of Rupert's Land, who ordained Mr. Horden deacon and priest, during his stay. During his Lordship's visit the Rev. E. A. and Mrs. Watkins arrived from England to strengthen the mission, and were sent forward to occupy Fort George on the eastern shore of Hudson's Bay. The bishop visited Moose again in 1855 and 1859, each time expressing the greatest satisfaction at the progress he witnessed. One great cause of advancement was the translation of large portions of the Scriptures into the Indian language, the first of which were printed by Mr. Horden himself at Moose, with a press sent to him by friends in England. These books are all written in a syllabic character, the principle of which is that each letter represents a whole syllable, a consonant and vowel combined ; the system is easily acquired and is almost universally known by the natives of the whole diocese of Moosonee, books being printed in it in the Cree, Ojibbeway, Eskimo and Chipewayan languages. In the Cree Mr. Horden has translated the New Testament, the Old Testament, lessons for Sundays and holy days throughout the year, the Psalter, Common Prayer Book, Hymn Book, and Bible, and Gospel History. Into the Ojibbeway have been translated Common Prayer Book, St. Matthew's Gospel, Acts of the Apostles, Hymn Book, and Bible, and Gospel History, and several works into the other two languages named.

The mission continued to grow and prosper, extending its influence more and more every year, until it was felt that the time had arrived for combining the missions around the bay into a bishopric, and accordingly Mr. Horden was invited to England in the autumn of 1872, and on December 15th was consecrated in Westminster Abbey as the first Bishop of Moosonce. For the effective working of the immense diocese placed under his charge, the bishop divided it into six districts.

With the exception of the Eskimo in the vicinity of Churchill and northwards, nearly all the natives have been received into the Christian Church, and except the Indians of Abbitibee, Waswanepo, Machiskun, and half those connected with Albany, who are Romanists, and those of Oxford House, who are Wesleyans, all are in connection with the Church of England. The clergy, under the bishop, labour most indefatigably, and there is not one of them of whom the bishop does not speak in the highest manner. Churches have been erected, a part of them by the Hudson Bay Company, at Moose, Albany, Fort George, Rupert's House, Little Whale River, York, Severn, Trout Lake, Matawakumma, Flying Post and Churchill, while another is now being built at Mis-tasince. Confirmations had been held in the diocese, when it formed part of the diocese of Rupert's Land, by Bishops Anderson and Mackay at Moose, Albany and Rupert's House ; the Bishop of Moosonce has confirmed at York, Churchill, Severn, Trout Lake, Moose, New Post, Albany, Rupert's House, Eastmain, Fort George and Matawakumma, and has confirmed 697 persons.

The number of communicants at Moose is 105, and in the diocese altogether about 700.

The following are the districts into which the Diocese of Moosonee is divided, with the population and languages spoken :

No. 1, Moose, *Comprising*:

	Pop.	Languages.
Moose.....	395	English, Cree.
New Post	34	English, Ojibbeway.
Abitibi	380	" "

No. 2, ALBANY, *Comprising*:

	Pop.	Languages.
Albany	500	English, Cree.
Henley	60	English, Ojibbeway.
Martin's Falls	300	" "
Osnaburgh, Cat Lake	440	" "

No. 3, RUPERT'S RIVER, *Comprising*:

	Pop.	Languages.
Rupert's House.....	362	English, Cree.
Eastmain River.....	103	" "
Waswanepo	129	" "
Mistasince	114	" "
Machiskun.....	61	" "
Nitchekwun	77	" "

No. 4, EAST MAIN, *Comprising*:

	Pop.	Languages.
Fort George	310	English, Cree.
Great Whale River }	500	English, Cree, Esquimaux.
Little Whale River ..		

No. 5, MATAWAKUMMA, *Comprising*:

	Pop.	Languages.
Matawakumma	105	English, Ojibbeway.
Flying Post	114	" "
Metachewan	87	" "
Misenabe, Brunswick	250	" "

No. 6, YORK, *Comprising*:

	Pop.	Languages.
York	330	English, Cree.
Severn	200	" "
Oxford House	350	" "
Trout Lake	350	English, Ojibbeway.
Churchill	350	English, Esquimaux, Chipawayan.

In some cases in above table the numbers are but approximate, while in others they are exact.

In conclusion I may observe that if "the boundary question" had been definitely settled there are other subjects which I should have felt it to be my duty to bring under the notice of the Government. The urgent need of a lockup and other buildings, and

also the desirableness of the appointment of one or two constables in and for this territory, would have been again respectfully presented. The subject of a grant in aid of education might also have been very properly brought forward, and would, I am persuaded, have met with a favourable response from the Government, and the approval of the country at large. The social condition of the natives and others in this territory was discussed in my Report for 1879-80. On page 32 the following were given as the conclusions at which I had arrived :

"The position of the natives of this territory in relation to the Hudson's Bay Company and its officers, has, therefore, been for many years, and still continues to be, a condition of absolute subservience and dependence. Such a position, up to a certain point, in the civilization of a savage race, may not be an unmitigated evil. There are not wanting those who maintain that it is no evil at any stage of civilization, provided that the governing and directing power is not only just, but mild and paternal. I shall not discuss this question, merely contending that this stage, if there be such, previous to which dependency and subserviency are beneficial even to the subservient race, has now been reached by the natives of this territory, and that its prolongation is altogether undesirable, in as much as it is unjust to the natives (many of whom are white men), impedes their further progress, retards the development and settlement of the country, and is inconsistent with the whole tenor and spirit of our institutions. The remedy, and only remedy, in my humble opinion, for this state of things is *to open up this territory*, and that done, the rest may be safely left to the natives themselves, and to the energy, industry and enterprise of the people of Canada."

Such were my opinions then, and such are my convictions now. The interests of the people of this territory and of the Province at large, alike suffer by the continued refusal of the Federal Government to submit to the award of the arbitrators appointed to define the boundaries of Ontario. Every step necessary to open up the country, and to ameliorate the condition of its inhabitants, whether it be their physical comfort, their education, or even their moral and religious welfare, is completely paralyzed. It is to be hoped that this deplorable state of affairs may be soon brought to a final and satisfactory conclusion.

Respectfully submitted,

E. B. BORRON,

Stipendiary Magistrate.

APPENDIX.

LIST OF PLANTS FOUND NEAR MOOSE IN THE YEARS 1881 AND 1882.

The following list of plants, collected at or near Moose Factory, has been given to me by Dr. Haydon, to whose kindness I am also indebted for a number of interesting views of scenes and objects in the territory.—*E. B. B.*

The Scientific names determined at Kew, London, England.

SCIENTIFIC NAMES.	COMMON NAMES.	ORDER.
<i>Achillea millefolium.</i> (L.)	Yarrow	Compositæ.
<i>Actaea spicata.</i> (L.)	Herb Christopher	Ranunculaceæ.
<i>Alnus viridis.</i> (D. C.)	Mountain alder	Betulaceæ.
<i>Anaphalis margaritacea.</i> (Bath. et Hooks) . . . . .	.....	Compositæ.
<i>Anemone pennsylvanica.</i> (L.) . . . . .	.....	Ranunculaceæ.
<i>Apocynum hysopifolium.</i> (Ait.)	Indian hemp	Asclepiadaceæ.
<i>Arabis Hirsuta</i>	Roche cress	Cruciferæ.
<i>Aralia nudicaulis.</i> (L.)	Wild sarsaparilla	Araliaceæ.
<i>Arenaria laterifolia.</i> (L.)	Sandwort	Caryophyllaceæ.
<i>Artemesia absinthium.</i>	Wormwood	Compositæ.
<i>Aster aestivus.</i> (Ait.) . . . . .	.....	Compositæ.
<i>Aster paniculatus.</i> (Ait.) . . . . .	.....	Compositæ.
<i>Astragalus</i>	Milk-vetch	Leguminosæ.
<i>Bechmannia eruciformis.</i> (Hart.) . . . . .	.....	Graminæ.
<i>Calypso borealis.</i> (Salsib.)	Calypso	Orchidaceæ.
<i>Campanula rotundifolia.</i> (L.)	Harebell	Campanulaceæ.
<i>Campanula aparinoides.</i> (Pursh.)	Marsh-bell flower	Campanulaceæ.
<i>Capsella bursa pastoris.</i> (Maench.)	Shepherd's purse	Cruciferæ.
<i>Carex alpina</i> . . . . .	.....	Cyperaceæ.
<i>Carex ampulacea.</i> (Good.) . . . . .	.....	Cyperaceæ.
<i>Carex blanda.</i> (Deuey.) . . . . .	.....	Cyperaceæ.
<i>Carex dishela.</i> (Huds.) . . . . .	.....	Cyperaceæ.
<i>Carex lacustris.</i> (Wild.) . . . . .	.....	Cyperaceæ.
<i>Carex limosa</i> . . . . .	.....	Cyperaceæ.
<i>Cassandra calyculata.</i> (Don.) . . . . .	.....	Ericaceæ.
<i>Castilleja mimata</i> . . . . .	.....	Scrophulariaceæ.
<i>Circæa alpina</i>	Enchanter's nightshade	Onagraceæ.
<i>Chelone glauca.</i> (L.)	Turtle head	Scrophulariaceæ.
<i>Cinnia pendula.</i> (Trin.)	Wood reed grass	Gramineæ.
<i>Chrysanthemum leucanthemum</i> . . . . .	.....	Compositæ.
<i>Cladonia gracilis.</i> (Hoffm.) . . . . .	.....	Portulaceæ.
<i>Commandra livida.</i> (Rich.)	Bastard food flax	Santilaceæ.
<i>Cornus serica.</i> (L.)	Silky cornel	Cornaceæ.

LIST OF PLANTS, Etc.—Continued.

SCIENTIFIC NAMES.	COMMON NAMES.	ORDER.
<i>Cypripedium passerinum.</i> (Rich.) ..	.....	Orchidaceæ.
<i>Cypripedium parviflorum.</i> (Salsib.) ..	Small yellow ladies' slipper ..	Orchidaceæ.
<i>Cystopteris fragilis.</i> (Bernh.) ..	.....	Filices.
<i>Chiogenes hispidula.</i> (Torr. & Gr.) ..	Creeping snowberry ..	Ericaceæ.
<i>Diplopappus umbellatus.</i> (G. & G.) ..	.....	Compositæ.
<i>Elemus canadensis.</i> (L.) ..	.....	Gramineæ.
<i>Elemus mollis.</i> (R. & Br.) ..	.....	Gramineæ.
<i>Eleocharis argenta.</i> (Pursh.) ..	.....	Cyperaceæ.
<i>Eriophorum capitatum.</i> (Hort.) ..	Cotton grass ..	Cyperaceæ.
<i>Eleocharis palustris.</i> (R. & Br.) ..	Spike rush ..	Cyperaceæ.
<i>Emphrasia officinalis.</i> (L.) ..	.....	Scrophulariaceæ.
<i>Equestrum arvense.</i> (L.) ..	Horse tail ..	Equisetaceæ.
<i>Erigeron strigosum.</i> (Muhl.) ..	Fleabane ..	Compositæ.
<i>Erysimum cheiranthoides.</i> (L.) ..	Worm seed mustard ..	Cruciferæ.
<i>Epilobium augustifolium.</i> ..	Great willow herb ..	Onagraceæ.
<i>Festuca elatior.</i> (L.) ..	Fescue grass ..	Gramineæ.
<i>Fragaria vesca.</i> (L.) ..	Wild strawberry ..	Rosaceæ.
<i>Fucus serratus.</i> (L.) ..	.....	Algæ.
<i>Galium boreale.</i> (Michx.) ..	Northern bedstraw ..	Rubiaceæ.
<i>Galium trifolium.</i> (Michx.) ..	Sweet-scented bedstraw ..	Rubiaceæ.
<i>Galium verum.</i> (L.) ..	Bedstraw ..	Rubiaceæ.
<i>Gelidium cornutum.</i> (Saux.) ..	.....	Algæ.
<i>Gentian acuta.</i> (Michx.) ..	Gentian ..	Gentianaceæ.
<i>Geum rivale.</i> (L.) ..	Purple aneus ..	Rosaceæ.
<i>Glyceria aquatica.</i> (Smith.) ..	Reed meadow grass ..	Gramineæ.
<i>Habenaria dilitata.</i> (A. Gray.) ..	.....	Orchidaceæ.
<i>Habenaria rotundifolia.</i> (Richards)	.....	Orchidaceæ.
<i>Halena deflexa</i> ..	Spurred gentian ..	Gentianaceæ.
<i>Hedysarum boreale.</i> (Nutt.) ..	Hedysarum ..	Leguminosæ.
<i>Heracleum lanatum.</i> (Michx.) ..	Cow parsnip ..	Umbelliferæ.
<i>Hierochloa alpina.</i> (Raen.) ..	Holy grass ..	Gramineæ.
<i>Hordum jubatum.</i> (L.) ..	Squirrel tail grass ..	Gramineæ.
<i>Hieracium canadense.</i> (Michx.) ..	Canada Hawkweed ..	Compositæ.
<i>Iris versicolor.</i> (L.) ..	Larger blue flag ..	Iridaceæ.
<i>Impatiens.</i> (L.) ..	Touch-me-not ..	Balsamineæ.
<i>Juncus diffusus.</i> (Hoffe.) ..	.....	Juncaceæ.
<i>Juncus filiformis.</i> (L.) ..	.....	Juncaceæ.
<i>Juniperus communis.</i> (L.) ..	Common juniper ..	Coniferæ.
<i>Juniperus virginiana.</i> (L.) ..	False savin ..	Coniferæ.
<i>Lamium amplexicaule.</i> (L.) ..	.....	Labiateæ.
<i>Lathyrus maritimus.</i> (L.) ..	Everlasting pea ..	Leguminosæ.
<i>Lathyrus venosus.</i> (Muhl.) ..	Vetchling ..	Leguminosæ.
<i>Ledum latifolium.</i> (Ait.) ..	Labrador tea ..	Ericaceæ.
<i>Leonicera coerula.</i> (L.) ..	Mountain fly honeysuckle ..	Caprifoliaceæ.

LIST OF PLANTS, Etc.—Continued.

SCIENTIFIC NAMES.	COMMON NAMES.	ORDER.
<i>Leonicera involvulata.</i> (Banlus.)	Wild orange red lily	Caprifoliaceæ.
<i>Lillium philadelphicum.</i> (L.)	Twin flower	Liliaceæ.
<i>Linnea borealis.</i> (Gronov.) . . . . .	.....	Caprifoliaceæ.
<i>Lobelia kalmia.</i> (L.) . . . . .	.....	Lobeliateæ.
<i>Lysimachia ciliata.</i> (L.) . . . . .	.....	Primulaceæ.
<i>Lysimachia stricta</i> . . . . .	.....	Primulaceæ.
<i>Mianthemum bifolia</i> . . . . .	.....	Liliacæ.
<i>Mentha canadensis.</i> (L.)	Wild mint	Labiatæ.
<i>Mertensia pilosa.</i> (D. C.)	Lungwort	Borraginaceæ.
<i>Mimulus rigens.</i> (L.)	Monkey flower	Scrophulariaceæ.
<i>Mitella nuda.</i> (L.)	Mitre wart	Saxifragaceæ.
<i>Monenses glandeflora.</i> (Salsib.) . . . . .	.....	Ericaceæ.
<i>Oenathera biennis.</i> (L.)	Common evening primrose	Onagraceæ.
<i>Oxytropis campestris.</i> (L.) . . . . .	.....	Leguminosæ.
<i>Parnassia palustris.</i> (L.)	Grass of parnassus	Parnassiaæ.
<i>Peltageria apthosa.</i> (Hoffm.) . . . . .	.....	Lichines.
<i>Petasites frigida.</i> (Tries.) . . . . .	.....	Compositæ.
<i>Phleum pratense</i>	Timothy	Gramineæ.
<i>Poa nemoralis.</i> (L.) . . . . .	.....	Gramineæ.
<i>Polygonum auriculare.</i> (L.)	Goose grass	Polygonaceæ.
<i>Polypodium dryopteris.</i> (L.) . . . . .	.....	Filices.
<i>Polygenum viviparum.</i> (L.)	Alpine bitort	Polygonaceæ.
<i>Patamogeton pectinatus</i> . . . . .	.....	Waidaceæ.
<i>Patamogeton perfoliatus</i>	Sandweed	Waidaceæ.
<i>Potentilla comarum.</i> (L.) . . . . .	.....	Rosaceaæ.
<i>Potentilla fructicosa</i>	Shrubbery cinque foil	Rosaceaæ.
<i>Potentilla norvegica</i>	Cinque foil	Rosaceaæ.
<i>Primula mistassinica.</i> (Michx.) . . . . .	.....	Primulaceæ.
<i>Prunella vulgaris.</i> (L.)	Healall	Rosaceaæ.
<i>Pyrola chlorantha.</i> (Lin.)	False winter green	Ericaceæ.
<i>Pyrola secunda</i> . . . . .	.....	Ericaceæ.
<i>Pyrola rotundifolia.</i> (L.) . . . . .	.....	Ericaceæ.
<i>Polytrictum juniperium.</i> (Hedr.) . . . . .	.....
<i>Ranunculus pensylvanicus.</i> (L.)	Bristly crowfoot	Leguminosæ.
<i>Ribes hirtellum.</i> (Michx.)	Smooth wild gooseberry	Grosulaceæ.
<i>Ribes lacustra.</i> (Poir.) . . . . .	.....	Grosulaceæ.
<i>Rosa acicularis.</i> (Lind.) . . . . .	.....	Rosaceæ.
<i>Rubus biflorus.</i> (Richards)	Wild raspberry	Rosaceæ.
<i>Rumex salicifolius.</i> (Weim.)	Willow dock	Polygonaceæ.
<i>Sanicula marilandica.</i> (L.) . . . . .	.....	Umbelliferæ.
<i>Scirpus lacustris</i>	Bulrush	Cyperaceæ.
<i>Scirpus sylvaticus.</i> (L.) . . . . .	.....	Cyperaceæ.
<i>Scutellaria galericulata.</i> (L.)	Skullcap	Labiatae.
<i>Senico aureus.</i> (L.)	Squaw weed	Compositæ.
<i>Senico vulgaris.</i> (L.)	Groundsell	Compositæ.
<i>Shepherdia canadensis.</i> (Nutt.)	Canadian shepherdaria	Santalaceæ.
<i>Sherardia arvensis.</i> (L.) . . . . .	.....	Rubiaceæ.

LIST OF PLANTS, Etc.—Continued.

SCIENTIFIC NAMES.	COMMON NAMES.	ORDER.
<i>Silene inflata.</i> (Smith)	Bladder campion	Caryophyllaceæ.
<i>Sium lineare.</i>	Water parsnip	Umbelliferae.
<i>Sisyrinchium anceps.</i> (Car.)	Blue-eyed grass	Dioscoreaceæ.
<i>Smilacina stellata.</i> (Vech.)	Golden rod	Sinolaceæ.
<i>Solidago virgaurea.</i> (L.)	Bur reed	Compositæ.
<i>Sparganium ramosum.</i> (Heds.)	Hedge nettle	Typhaceæ.
<i>Stacya palustris.</i> (L.)	Hedge mustard	Labiatæ.
<i>Sysyraiberium humile.</i> (Cam.)	Pansy	Compositæ.
<i>Tanacetum huroneuse.</i>	Dandylion	Compositæ.
<i>Taraxicum officinale.</i> (Wig.)	Early meadow rye	Ranunculaceæ.
<i>Thalictrum dioicum.</i> (L.)	White cedar	Cupressineæ.
<i>Thurja occidentalis.</i> (L.)	Star flower	Primulaceæ.
<i>Trientalis americanus.</i> (Pursh.)	Arrow grass	Absimachæ.
<i>Triglochin maritimum.</i> (L.)	Wake Robin	Smilaceæ.
<i>Trillium cernuum.</i> (L.)	Couch grass	Graminæ.
<i>Tritum repens.</i> (L.)	Blind settle	Urticaceæ.
<i>Urtica gracilis.</i> (Ait.)	Cowberry	Ericaceæ.
<i>Vaccinium vitis idaea.</i> (L.)	Cranberry tree	Caprifoliaceæ.
<i>Viburnum apulus.</i> (L.)	American brooklime	Serophulaceæ.

MOOSE FACTORY, March 19th, 1883.

